

EVALUASI DAN PENGEMBANGAN JARINGAN DISTRIBUSI AIR BERSIH KOTA BANDAR LAMPUNG

Dian Pertasari (L2J003709)

Ir. Mochtar Hadiwidodo dan Wiharyanto Oktiawan, ST, MT

ABSTRACT

Bandar Lampung is a capital city of the Province of Lampung. In the growth, regions in Bandar Lampung is one of city in Indonesia have growth more quickly. The growth affects the demanding of public facilities completely such as water supply. At this time, PDAM Bandar Lampung has only services 25% of the people of Bandar Lampung or 30.199 connections such as 30.029 connections house and 170 connections public. Leaking of distribution level has 32% with water supply duration has 4-24 hours per day in the most of service region. PDAM Bandar Lampung has 641 l/s of production capacity. Expanding water supply of PDAM Bandar Lampung in 2017 planned reaches 41% of the people of Bandar Lampung city (projection result has 982525 people) or 59.751 house connections

Key words: house connection, distribution, debit.

**PENGEMBANGAN SISTEM PENYEDIAAN AIR MINUM PDAM KABUPATEN BLORA
(PERENCANAAN JARINGAN TRANSMISI DAN DISTRIBUSI
IKK JAPAH DAN IKK SAMBONG - BLORA)**

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ABSTRACT

Clean water is a vital need. The amount of water contrary with its demand. It happens in Blora Regency Central Java. The source of water here dwindle every year and almost impossible to develop the service. Developing the existing water supply system in Blora Regency means constructing the new system. Waduk Randugunting is planned will be constructed in 2010. It will be source of water for several system in Central Java. Japah District Capital Water Supply System will use the Waduk Randugunting for its water source. It is planned finish the construction in 2011 one year after the Waduk Randugunting construction. The new water supply system beside will build at Japah District it also will be built at Sambong. It will use Bengawansolo River for its source. Japah system will supply five village, and Sambong one will supply four village. The design of transmsion and distribution system for both of them is needed. The consideration of the design base on the number people and its projection, public facility development, water demand and its fluctuation, topography and roadway and reservoir system and distribution system.

Keywords : *water supply system, transmission and distribution system.*

STUDI KEHILANGAN AIR AKIBAT METER AIR PELANGGAN PDAM (STUDI KASUS: PERUMAHAN BUKIT LEYANGAN DAMAI UNGARAN, KABUPATEN SEMARANG)

SANGIDUN (L2J306015)

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ABSTRACT

Up to the present time, there're lot of Perusahaan Daerah Air Minum (PDAM) that couldn't be able to serve their customers in adequate quantity for 24 hours in one day. One of the factor that causing this problem are the high lost of water in distribution system that including physic lost and non physic lost. The non physic lost is caused due to the imprecise water meter that belong to the customer, so that the quantity of water that their use isn't appropriate to the money that they're paid. In this research was already been done a test about the water meter preciseness that belong to the customers in Bukit Leyangan Regency-Ungaran. Six hundred and twenty seven of water meter units tested, 61.08% of water meter total that been tested, the deviation of the imprecise of the water meter are < 2%, while the rest 244 units had deviation more than Metrology Standard that's 2 % only. Water meter with the deviation > 2 % in 244 units, 120 units causing disadvantage to the PDAM and 124 units causing disadvantage to the customers. Water consumption in July 2008, there had been water lost to the PDAM in amount of 403 m³ or 2.29 % from the distribution water in amount of 17,577 m³. At that moment, the disadvantage is also happen to the customer in amount of 107 m³ or 0.61 % from the distribution water. In conclusion, there're water meter units that imprecise causing water lost to PDAM in amuont of 296 m³ or 1.68 % from water distribution total. The comparison or ratio between water lost that caused by water meter to the water lost in distribution system is 3.10 %. The accurate level of water meter is depend on equipment life and the brand of water meter that been used.

Key word: *Unaccounted for water (UFW), Water meter*

DETAIL DESAIN SISTEM PENYEDIAAN AIR BERSIH
MENGGUNAKAN SUMBER MATA AIR
(Studi Kasus : DAS Citarik, Kecamatan Cimanggung, Kabupaten Sumedang)

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ABSTRACT

Water is one of the fundamental needs of human being, but not everyone could easily access it. At Kecamatan Cimanggung, kabupaten Sumedang there are a few spring water that could be used, but there is no sufficient clean water supply system available. This has caused the people at the area found difficulties to obtain clean water. The objective of this Final Assignment is to create a detail design of a clean water supply system by using spring water to solve the problem. The design of this design was made according the available existing condition, clean water quality standard that regulates at the moment and the design criteria from a variety of of literature. According to the analysis, the desirable clean water supply system design is a broncapturing, storage tank, BPT, reservoir, hydran and also transmission pipeline.

Keywords : spring, detail design, water supply system

**RENCANA INDUK (MASTER PLAN)
SISTEM PENYEDIAAN AIR MINUM
KABUPATEN BREBES**

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ABSTRACT

Brebes District is one of district in central java, consist of seventeen sub-districts and need water supply facilities as basic physic facilities. Water supply system in Brebes District usually use conventional system, some utilize ground water source using deep well. But most of people need common wells to supply their needs. PDAM Brebes just only serve 7 % of people need of water. There are many source of water that have potency to be drinking water source because have large surface area and will not dry along year. Beside that, there are natural mountain water which enough quality and quantity. We need to know the water source supply compared with water demand in each of IKK and how to utilize the supply capacity so Brebes District needs a formula as a masterplan of water supply in each IKK in Brebes District.

Key words : Masterplan, Water Supply, IKK.

DETAIL DESAIN SISTEM PENYEDIAAN AIR BERSIH KOTA SALATIGA

(Studi Kasus : Kelurahan Cebongan, Dukuh, Sidorejo Kidul, Bugel,
Kauman Kidul)

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ABSTRACT

The need for clean water is a vital need. We could only save the usage but we could never get rid of our need for clean water. This also happens to five sub-districts at Salatiga which scope are: Cebongan, Dukuh, Sidorejo Kidul, Bugel, and Kauman Kidul Sub-district. The problem of clean water fulfillment, especially at dry season, must be handled immediately. The PDAM pipe line network which hasn't touch most of the sub-district are a problem, but the potential of deep well and spring water which became the assets of the scoped area must be developed as a solution. This final paper is in favor to produce a Detail Engineering Design for a clean water supply system through a good pipe line network, which is hoped to be the answer for the occurring problem. Based on the engineering analysis, the design of clean water supply system needed are a deep well construction plant, reservoir, pump house, public hydrant and also distribution line piping.

Keywords : deep weel, spring water, detail design, water supply system

**EVALUASI JARINGAN DISTRIBUSI AIR BERSIH KABUPATEN TEGAL DAN
PENGEMBANGAN JARINGAN DI IKK LEBAKSIU DAN IKK PANGKAH
KABUPATEN TEGAL**

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ABSTRACT

The increase on development activity and population has caused on the increase for the need of clean water. This also occur at Pangkah and Labaksiu District, Tegal. The PDAM distribution pipe which haven't touch most of the area at the District were one of many problems that needs to be taken care of in term with the fullfilment of people's need on clean water. The purpose of this Final Assignment is to evaluate the Tegal's clean water distribution system and produce a fine clean water distribution system expansion planning through distribution pipe at Pangkah and Lebaksiu, which is hoped to be the answer for the existing problems. Based on the planning analysis, the needed clean water distribution design were distibution pipe and clean water disribution pipe accecories.

Keyword : *Pipe line, pipe accecories and clean water distribution system.*

**EVALUASI DAN PENGEMBANGAN JARINGAN
SISTEM PENYEDIAAN AIR BERSIH PDAM SAMPIT,
KALIMANTAN TENGAH**

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ABSTRACT

Sampit City is capital city of Kotawaringin Timur Regency, middle province of Borneo. Level of Population Growth in Sampit City is 3,48 % a year. The growth of population causes general facilities in Sampit City are needed to be fulfilled, such as supply of clean water. At this moment, Sampit PDAM has served 72 % people from total Sampit population. Production leakage level is 24 % with duration of clean water service is 4-15 hours a day. The objective of this final assignment is to know urban community clean amount of water required sampit city, evaluation clean water system network and plan clean water system network development with master plan urban planning of sampit city and population growth. Clean water system network development pdam sampit is planned in the year 2009 - 2015 with service enhanced up to 80 % and service duration 24 hours a day. Based on evaluation result, need development transmission system and reservoir, development distribution pipe and service area development.

Key word : distribution system, water required predictions, improvement service

PERENCANAAN SISTEM PENYEDIAAN AIR BERSIH RUMAH SAKIT BETHESDA YOGYAKARTA

DIPTYA DHYAKSARI (L2J 099 753)

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ABSTRACT

Bethesda hospital in Jogjakarta at the moment has 73% services based on Bed Occupation Ratio (BOR) in the year 2003 and 2004. To increase the quality of service and take care of good sanitation, hence expected to reach 100% of clean water service. At Bethesda hospital there are 4 shallow well with 12 liters/second of charge, the amount cannot fulfill the clean water required so that done by addition of 3 liters/second water which taken from deep well. Problem of the quality of the deep well evaluated from Permenkes No. 907/Menkes/SK/VII/2002 known the parameter manganese (Mn) with the rate 0,3 mg/liter, it's a problem for drinking water, so the solution is made a water treatment with pressure filter with activated sand media. The planning of water distribution is simulated with Epanet 2.0 and obtained head average 16 meter, average velocity 1,3 meters/second, and average water level 8,5 meters.

Keywords: deep well, clean water distribution

RENCANA PENGEMBANGAN SISTEM PENYEDIAAN AIR MINUM KOTA KLATEN

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ABSTRACT

As a capital of Klaten Regency, Klaten City's water demand is accomplished by non piping system (ground water) and piping system (PDAM). At year 2002, PDAM's service covered 49 % of the citizen of Klaten City. There are several problems with the existing condition of water supply system, that are the incapability of the system to fulfill customer's water demand, and the limited capacity of ground water, which quality is not suitable with the standard. This condition proved that Klaten City needs water supply system development.

Analyses begin by comparing the existing condition with city planning and design criteria. The results will be the basic concept for development design. The analyses results shows that water production could only supply the present demand. Network pressure not suitable with the design criteria so it cannot serves all area. The reservoir capacity is less than 10 % of maximum daily needs, that is not suitable with the criteria. Based on these, the water supply system will be developed, which are include water sources system, transmission, distribution, and reservoir. Water sources development conducted by adding two units of deep weell, with total capacity 30 l/s. Transmission system will be using PVC pipe, with 150 mm in diameter and 150 m in length. Distribution network development includes new distribution line and adding pipes which are paralel with the old ones to increase water flows and pressures. Distribution pipes will be using PVC pipe, with 100 mm until 250 mm in diameter. The new reservoir is a tower reservoir, which volume is 1000 m³.

The developing of Klaten City will be increasing the water demand. The water supply system must accomplish the basic concept of water quality, quantity, and continuity. To accomplish it, Klaten City needs a capable water distribution network design.

Key words : water distribution, piping system, network design

**RENCANA PENGEMBANGAN
SISTEM DISTRIBUSI AIR BERSIH (KAWASAN UTARA KOTA SURAKARTA)**

Warningsih (L2J 099 792)

Ir. Mochtar Hadiwidodo dan Ir. Theresia, MSi

**PERENCANAAN SISTEM PENYEDIAAN AIR MINUM
IKK SAMBUNG MACAN KABUPATEN SRAGEN**

MUHAMMAD PURWAKA ADI NUGRAHA (L2J 099 776)

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Abstrack

Sragen Town is the capital town of Sragen's regency, Province of Central Java. Accomplishment of drinking water in Sragen Town is doing by non-piping sistem and piping sistem (PDAM). The PDAM procentage of service is 46 % from the total of population until end of year of 2003. There are many problems in water supply system of PDAM Sragen, and the most serious problems are pressures, water losses, and the energy supply. The five distribution sistems evaluations give bad results, which a lot of point of tapping have problem with the insuffience pressures, and it gives impact un optimal services to the customers of PDAM. So, the evaluation recommend to rehabilitate the distribution network and not a network expantion and development. The Planning of system development of water supply system will do in IKK Sambung Macan, because the urgent of the water supply sistem for this place. The result of survey showed 71 % the IKK Sambung Macan population Want to be PDAM customer.

Key words : water supply system, evaluation, development, distribution network,

Application of Integrated Programs of Geographical Information System (MapInfo 6.0) and Network Analysing (EPAnet 2.09) for Estimating Water Loss in Public Water Industry

(Case Study: Water Loss as Long as Primary Pipelines at Sampangan All Around Region in Semarang City)

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ABSTRACT

Development of Geographic Information System (GIS) such as tools for phenomenon analysing basic on geographical integrated data, so analysing has done by holistic and spacial scope. Integrated design of GIS software (MapInfo 6.0) with pipelines distribution network software(Epanet 2.09) used for analyze of water losses in water distribution pipelines (Case study on primary pipelines for Sampangan all around region). Integrated programs has used for engineering management of public waterpipelines for waterloss estimating ones . It is macroanalysing (major losses in pipelines principles) that spacial related. Pressure difference at node between simulation and field checking is pressure loss that flow loss as long as those pipelines.

(Keywords : GIS, network analysing, MapInfo and EPAnet integrated, pipelines distribution network, water loss, drinking water)

Evaluasi Sistem Penyediaan Air Bersih Kota Kartasura

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ABSTRACT

The increase of clean water consumption have correlation with growth and resident growth of a region. To fulfill the requirement, there is a need for a water supply system which can work properly. Kartasura through PDAM earn to give maximal service. But at the moment there are some problem that occurred at water supply system of Kota Kartasura. This evaluation aim is to learn various problems that exists in water supply system of Kota Kartasura.

Evaluation formed on the basic to some factor conducted to system of drinking water service in Kota Kartasura indicate that circumstance existing in the year 2005 is under adequate according to national standart service of drinking water . The actual condition especially can be seen from leakage storage level which high enough that is 50,55 % so that cause the lack of water debit distributed to costumer.

The result of evaluation then can be applicable to reach goals that is the increasing of service percentage from 13,48 % becoming 56,74% from population amount in the year 2015 and the leakage emphasis till fulfill government standard. Water supply system evaluation of Kota Kartasura cover permanent water source, reservoir, transmission and distribution system used to reach the target.

Key words : Raw water source, transmission, distribution

ANALISA JARINGAN DISTRIBUSI SISTEM PENYEDIAAN AIR BERSIH KOTA BOYOLALI

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ABSTRACT

Water pressure in pipe represent important factor in drinking water supply system. To earn to conduct water optimally, required enough pressure. That is between 10 until 80 mka. Drinking water supply system of Boyolali City in the year 2005 is not optimally yet. Because still exist pressures values outside of planning standard. According to simulation result with Epanet Version 2.0, minimum pressures at peak hour condition (at 07:00) is -1,83 m and maximum pressures is 106,70 m. But, raw water productions in the year 2005 still answer the demand of residents consume requirement. Mean produce per day is about 7.241,40 m³/day and water consume is about 5.718,96 m³/day. Thus, in distribution pipes network of clean water is need to repair to reduce the happening of water leakage because of big pressures. Distribution service of clean water in PDAM of Boyolali City after repaired to become better because yielded pressures fulfilling criterion of water pressures planning in distribution pipes network. According to simulation result with Epanet Version 2.0, minimum pressures at peak hour condition (at 07:00) is 8,10 m and maximum pressures is 69,90 m

Key words : water supply, distribution pipe network, pressure, flow quantity and continuity.

**EVALUASI DAN PENGEMBANGAN
SISTEM PENYEDIAAN AIR MINUM PDAM KABUPATEN BANYUMAS
DAERAH PELAYANAN KOTA PURWOKERTO**

Hendra Septiawan*, M. Arief Budihardjo **, Dwi Siwi Handayani **

ABSTRACT

Purwokerto city is the capital of Banyumas regency, central java province. The population growth rate of Purwokerto city is 0,6 % per year. The increasing of the population and area development causing the accomplishment of public facility needs such as water supply also progressively increase. At the moment, PDAM of Banyumas regency serves 65 % of the population of Purwokerto city and has production capacities equal to 569 l / second. The leakage rate of production equal to 37,5 % with drinking water service duration 18-22 hour per day. Based on the analysis and evaluation, it is necessary to conduct the design plan to optimize and develop the water supply system in Purwokerto city. The development is being planned in 2009-2015 with increasing of service rate until 80 % and the service duration 24 hours, as it says in Millenium Development Goals (MDGs).

Keyword : *water supply, leakage rate, evaluation, development, service.*

**EVALUASI DAN OPTIMALISASI JARINGAN
SISTEM PENYEDIAAN AIR BERSIH SUB SITEM BRIBIN,
KABUPATEN GUNUNGKIDUL**

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ABSTRACT

Bribin Sub-system is one of the 13 (thirteen) sub-systems owned by the PDAM in Gunungkidul district. Bribin sub system has a very big potential water source, it is an underground river with average flow rate around 1000 liters / sec. But the clean water is not evenly distributed. Recently, existing 6478 units of house-connecting installeds in the Bribin sub system service area, but only 27% get water from PDAM. This is due to the lack of funding from PDAM to facilitate the entire service area so that clean water distribution is uneven. One of the solution to solve this is by injecting flow rate obtained from microhydro technology applicated in Bribin underground river. With this flow rate addition, an effective alternative transmission lines from the new source in to existing system surely needed. It is planned 2 alternatives transmission lines, the first one is connecting outlet pipe from Kaligoro Reservoir to junction 275 and the second one is connected to junction 274. From the analysis, the chosen alternative is the first alternative because it is proved able to distribute water more even. Nevertheless, its headloss in amount 9,054 m is bigger than the second alternatives and it also cost more in amount Rp.6.406.263.750,00.

Keywords: *water supply systems, sub systems Bribin, microhydro technology*

**OPTIMIZATION OF WATER DISTRIBUTION SYSTEMS
IN REDUCING WATER LOSS
PDAM SRAGEN SIDOHARJO UNIT**

ABSTRACT

Water loss is the difference between the amount of water distributed by PDAM with the number recorded in the customer's account. The average of water loss that occurred in PDAM Sidoharjo unit in December 2008 is about 27,22%, it exceeds the reasonable limits water loss which is 20%. Optimization done because the unit process or the system experiences depression of work functions so it needs to be analyzed to optimize its function. Optimization of water distribution system is done within the scope of reducing the level of water loss due to water loss factor in technical and non technical. Technical water losses caused by some damage to the distribution pipes and the amount of water for flushing that is not recorded. While, the non technical water loss caused by inaccuracies customer water meters, water meters damage interconnection, and indiscipline officer meter reader. Optimization done to improve the performance of each unit of the distribution system that minimizes the loss of water include the establishment of the zone distribution services into 4 zones, replacement of customer's water meters that have been damaged, scheduling and recording the amount of water for operation and improvement of management and administrative systems. Based on technical analysis, loss prevention priority is for the establishment of water service zone in distribusi making it easier to monitor water use in the zone

Keyword: *water loss, distribution systems, optimization*

**PERENCANAAN SISTEM PENYEDIAAN AIR MINUM PDAM
KABUPATEN BREBES DAERAH LAYANAN KECAMATAN
KETANGGUNGAN**

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**EVALUASI DAN RENCANA PENGEMBANGAN
SISTEM PENYEDIAAN AIR BERSIH
PDAM KABUPATEN SRAGEN
DAERAH PELAYANAN KECAMATAN SIDOHARJO**

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ABSTRACT

Sub Sidoharjo in Sragen, Central Java Province, with the number of villages as many as 12 villages and the planning area as much as six villages. District population growth rate is 0.19% Sidoharjo per year. Increasing population and development needs of the region led to the fulfillment of public facilities such as clean water supplies have also increased. At this time, Water Unit serving Sidoharjo 6.7% of the population of Sub Sidoharho and has a production capacity of wells in a 20 l / s with a duration of service for 24 hours. Based on the results of the evaluation and analysis, there are some things that need to be done to improve the existing system in order to develop clean water supply systems. Development planned for the year 2009 - 2019 with the improvement of services to reach 2-3% per year and the year 2019 reached 39.13%. For the development of raw water sources are wells pungruk increase capacity to 40 liters / second and the location of wells in addition to the purwosuman flow 20 liters / second.

Keywords: *water supply, evaluation, development, services*

**PERENCANAAN PENGEMBANGAN
SISTEM PENYEDIAAN AIR MINUM
IKK RANDUDONGKAL KABUPATEN PEMALANG**

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Ir. Endro Sutrisno, MS

ABSTRACT

IKK Randudongkal is capital of Randudongkal District which consists of 4 countryside, namely Randudongkal, Karangmoncol, Penusupan and Mejagong. Growth rate of IKK Randudongkal resident is 0,63 % per year. The growth cause accomplishment of public facilities requirement such as clean water supply increasingly. At The Moment, PDAM Randudongkal has served Countryside of Randudongkal and Karangmoncol or approximately 18 % from amount residents of IKK Randudongkal with produce capacities 10 l/s and service during 24 hour. Development of water supply system at IKK Randudongkal planned in the year 2010 - 2021, covering entire countryside at IKK Randudongkal with improvement of service 2 - 5 % per year and service 24 hour.

Keyword : Development, service, IKK Randudongkal

**ANALISIS DAYA TAMPUNG BEBAN CEMARAN BIOCHEMICAL
OXYGEN DEMAND (BOD) SUNGAI DENGAN MENGGUNAKAN
METODE STREETER PHELPS DAN METODE QUAL2E
(Studi Kasus : Sungai Garang, Jawa Tengah)**

**Deardo Chandra Vaskanus Purba^{*)}, Winardi Dwi Nugraha, Haryono Setiyo
Huboyo**

ABSTRACT

Garang river basin which is located in Central Java passed the Semarang District (upstream), District Kendal (middle), Semarang (downstream). Environmental problems of the Garang River is increasing water pollution load. BOD is an indicator of water pollution. BOD load capacity of can be identified by using the concept of modeling. The method that used in the calculation of load capacity Garang River BOD contamination are QUAL2E model and Streeter Phelps method. Based on simulation results that using QUAL2E method and Streeter Phelps method, contamination BOD load on the minimum flow standard quality compared to Government rules No. 82 of 2001 found that Garang River is not between the quality standards for BOD in segment 1 class 4 with seating capacity > 603.44 kg / day. While the simulated contamination load capacity BOD that using QUAL2E method and Streeter Phelps method at the maximum flow compared with the standard quality BOD in Government Rules No. 82 of 2001 found that Garang River can not meet the quality standards for Class 1, Class 2.

Key words : *Garang River, Pollution Load, QUAL2E Method, Streeter Phelps Method.*

**EVALUASI DAN PENGEMBANGAN
SISTEM DISTRIBUSI AIR BERSIH
KECAMATAN JEBRES KOTA SURAKARTA**
Wiharyanto Oktiawan, *, Mochtar Hadiwidodo**, Fitri Wijayarani

ABSTRACT

Jebres sub district is a part of Surakarta administration area. It is one of sub district with quite high ratio population growth. Water supply demand is rise as high as population growth . Jebres sub district include in north and central region of service area PDAM Surakarta.. In 2008, PDAM Surakarta only serve 55,6 % people of Jebres sub district or 15141 connections, such as 14997 house connections and 144 public connections. . Leaking of distribution level has 38% with water supply duration has 15 hours per day in the most of service region. PDAM Surakarta has planning to developing distribution system in center region to be center and east region. Center region has production capacity 413,22l l/sec. The Expanding water supply of PDAM Surakarta of center region in 2018 have plan to reaches 60% people of Jebres sub district (projection result has 93.982 people) or 8111 house connections

Keywords: *Jebres sub district, distribution, center region*

**PENENTUAN KELAS AIR, DAYA TAMPUNG BOD,
DAYA TAMPUNG COD DI SUNGAI GARANG,
JAWA TENGAH**

FRANCINE AJENG KRISITA (L2J 005 759)

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ABSTRACT

The Garang River is one of the rivers in Central Java that passed The Semarang Regency, Semarang City and the Kendal Regency. The Garang River such as BOD and COD disposal burdens that were the indicators of water pollutant dealt the problem of the environment. To learn the BOD and COD capacity in the Garang River, the researcher tried a modeling system. The method is by using Qual2E Software for BOD and mass balance for COD afterwards compared with the standard in accordance with PP no 82 in 2001 about the water quality management and control water pollutant. Besides was carried an identification water grade with a storet method. From the water grade identification, we know that all the segments of the Garang River had the good quality for the fourth grade. The results of BOD simulation are having capacity for more pollutant but not for the fifth segment. The result of COD simulation shown that in the minimum debit along the Garang River had none capacity but there is a little in the maximum capacity for grade III and grade IV.

Keywords: Garang River, pollutant capacity, BOD, COD, simulation

**ANALISIS PENENTUAN MUTU AIR DENGAN METODE STORET DAN
INDEKS PENCEMARAN
(Studi Kasus Sungai Garang, Serayu, dan Gung – Jawa Tengah)**

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ABSTRACT

The existence of a river will naturally form a river ecosystem which usually called as river basin. There are some river basin in Central Java, such as Gung River Basin, Serayu River Basin and Garang River Basin. Many sector that are dependable on the river resources, while on the hand the quality of the river is decreasing because of the waste water pollutant produced by many human or industrial activities. Therefore, proposal study of water class determination can be done by 2 methods according to Environmental Ministry Decision No. 115 year 2003 about Water Quality Status Determination Handbook, which are STORET and Pollution Index (PI). Using those two methods will be determined the real water class through comparison between water quality parameter with defined standart acoording to PP No. 82 year 2001. The usage of these 2 methods often resulting in different output, because of the difference of equal weight from each parameter and the existence constanta of P at Poluution Index (PI) which not clear relevancy.

Keywords : water quality, STORET methods, Pollution Index methods

**STUDI EVALUASI EFISIENSI PEMAKAIAAN AIR
UNTUK OPERASIONALISASI
OPEN RECIRCULATING COOLING WATER SYSTEM
PADA INDUSTRI TEKSTIL
(Studi Kasus Pada Industri Tekstil PT. X)**

Nasrullah, Wiharyanto Oktiawan*), Adi Jatmiko**)

Abstract

A lot of industrial use water in their process to support their operational. One of the systems that use a lot of water in a textile industry is the cooling water system. In this system, water is taken from water source (etc: deep well). The water is then flown into a condenser that is connected with a chiller and is used as a media to decrease the temperature of the production machine, room, and all the equipment that is used in the industry. There is two kind of Cooling water system: 1.) *Once through system*, which a cooling system that runs water through the system once, then the water discarded. 2.) *Recirculation system*, which is a cooling system that circulates water so it will be reused. The advantage of once through system is that the system can run well cause the quality of the water can be maintained. But the disadvantage is the use of water will be very big or will be squandered. On the contrary using the recirculation system can save more water. This study will evaluate the efficiency of water using in the open recirculation cooling water system. The statistic test result taken from three units of the textile industry, shows that the changes of the debit are comparable to the changes of concentration and the changes of the temperature (ΔT) from the water bait hardness and the blow down water. To reach an optimal level of the temperature in the cooling system can be done by adjusting the water bait debit and the blow down. To establish the optimization in the blow down can be done by analyzing the regression and the correlation between debit cycles and the temperature changing (ΔT). The graph shows that debit cycles will be optimal when the temperature changing (ΔT) is optimal too, that is when the $\Delta T=5^{\circ}\text{C}$. The evaluation of the efficiency is done by comparing the amount of water that is been use between the once through system and the open recirculation system in the optimum level. Without counting the debit, we can also count the efficient by using the optimality of the system. In the once through system the cycles is considered as 1 (one), cause there is no cycles in this system. The optimal cycles in cooling system in Weaving unit, the Spinning unit and the Diesel unit is 2,6; 2,5; and 2,5. Because of that the calculation of the efficient evaluation of the water using in the cooling system of PT. X in the Diesel and Spinning unit is 60% and in the Weaving unit is 62%.

(key words : cycles, debit, hardness, delta T, efficiency)

“Pengaruh Kepadatan Permukiman Terhadap Kualitas Air Tanah Dangkal Akibat Rembesan Air
Dari Tangki Septik, Ditinjau Dari Parameter Bakteri Coli”
(Studi Kasus di Kecamatan Semarang Tengah)

Aniek Setianingrum; Endro Sutrisno, MS*; Badrus Zaman, ST. MT**.

ABSTRACT

The increase of clean water requirement push greater exploiting of ground water as public water source. The aim of this research were to know the influence of well and septic tank distance in high density settlement toward Coli bacteria concentration in ground water well as the effect of liquid seepage from water septic tank. This research also try to find out the quality of ground water well in high density settlement as the household water source from parameter pH, turbidity, salinity and temperature.

Result of this research showed that 21 sample checked entirely have contaminated by Coli bacteria (fecal coli) in concentration exceeding maximum number which allowed in drinking water (Kepmenkes No.907 Tahun 2002) and clean water (Permenkes No.416 Tahun 1990). Statistical analysis showed that there are correlation between density level with number of MPN Coli in ground water well equal to 97,6%; and correlation between distance of septic tank and well with number of MPN Coli equal to 98,7%. From equation obtained recommended distance between ground water well and septic tank should be minimal 15 metre to avoid fecal contamination.

Keywords: Ground water; Coli Bacteria; Septic Tank.

PENGARUH BUANGAN LIMBAH AIR PANAS PLTU TERHADAP PERUBAHAN PARAMETER BIOLOGI

(Studi Kasus : Kolam Pelabuhan Tanjung Emas Tambak Lorok)

MIRNA SARI SIREGAR

Badrus Zaman, ST, MT

Nurandani Hardyanti, ST, MT

ABSTRACT

PLTU Tambak Lorok is a electrical generator plant that uses steam as the main generator to produces electrical power. The electrical generator plant's instalation needs water as a media to cool the boiler. Because of that PLTU Tambak Lorok has some kind of side effect by forming some kind of heat wastewater which temperature reaches about 37°C. When the heat wastewater is disposed to some near water site, the temperature could be risen vastly that it could affect all sorts of physical and chemical character which also has it own affect to the water quality and the water organism lives. Phytoplankton which's a part of the food chain system for sea organisms could be used as some kind of biology indicator to watch over the polluting that caused by thermal discharge. For knowing the intensity of the polluting, polluting index is used with Shanon-Wiener's Diversity Index.

Based in Shanon-Wiener's Diversity Index and using phytoplankton as the indicator, Semarang Tanjung Emas's port's pool is currently in a medium polluted state with diversity index 1.48. The measurable parametres are temperatur, dissolved oxygen and salinity. From the analysist of physical-chemical parameter changes to the diversity index we could assume that each time the temperature is increased by 1°C it will causes a decreasing water quality index as far as 0.03. The increasing of the dissolved oxygen in the water as high as 1 mg/l will causes a risen index as high as 0.23 and the increasing of salinty about 1‰ which will causes an increasing index to 0.51.

Keywords : Heat Wastewater, Phytoplankton, Diversity Index

**ANALISA Pb DI SEDIMEN DAN HUBUNGANNYA
DENGAN KEANEKARAGAMAN DAN KUANTITAS MAKROBENTOS PADA
KOLAM PELABUHAN TANJUNG EMAS SEMARANG**

Ignatius Ricky Setiawan

Haryono Setiyo Huboyo, ST, MT

M. Arief Budihardjo, ST, MEng.Sc

ABSTRACT

The increase of industrial amount and commerce will add burden polutan into territorial water port. Some of the industry use heavy metal in the production process and traffic of commerce such as boat for loading and unloading and also fishing boat enabling to increase the heavy metal content of Pb coming from used fuel (Salomon et al., 1984 in Takarina dkk, 2001). Pursuant to heavy metal monitoring by some research obtained evidence that Semarang coastal territorial water have contaminated by heavy metal, although concentration of highest heavy metal there at sediment, and then be followed by biota and hereinafter at water. Sediment have important role as place accomodating of polutan or heavy metal thrown to enviroentment.

The quality of territorial water of Tanjung Emas water port pool pursuant to index of variety makrobenthos in a condition the variety is medium. Mean of An Index To Variety 2.87. There are relation between Concentration of Pb in sediment with Index of variety, the relation of the two variable is inclusive of strenght with $r = 0.918$. Obstetrical increase of Pb in sediment as much 1 mg/kg joined by the degradation of index equal to 0.367 with equation $y = 0.566 - 0.367x$. Obstetrical increase of Pb in sediment as much 1 mg/kg joined by degradation of amount makrobenthos equal to 65 individu/kg with equation $y = 65 - 65x$. Excelsior of Concentration Pb, sum up makrobenthos progressively lower.

**Model Indeks Kualitas Perairan
Pada Kolam Pelabuhan Tanjung Emas Semarang
(Studi Kasus Pada PLTU PT. Indonesia Power)**

Nur Hariadi, Badrus Zaman, Syafrudin

ABSTRACT

The industrial waste water by PLTU PT. Indonesia Power into shore, making the quality of territorial waters in Tanjung Emas Semarang bay area decreased. The alteration of territorial waters quality can be shown in the number form by quality of territorial water quality index method. The PLTU's waste water has temperature characteristic 37⁰C above standard. Based value for sea waters according to resolution of Minister of Environmental No. 51/2004 about standard based value sea waters span controlled temperature 28⁰C-30⁰C. Based on Nemerow Sumitomo waters quality index value, the index quality of Tanjung Emas bay territorial water 3.34 identical counted as light polluted category. According to diversity makrobentos index as determines in territorial waters index biologically, makrobentos indicator result index value 1.01 identical as medium polluted category. Makrobentos in Tanjung Emas bay area spread evenly in 0.423 scale. Based on prediction index which is development from Nemerow Sumitomo index with value 13.8 is light polluted. The value of index span prediction is good if <10 in pH condition between 7-8; turbidity ≤5 NTU; salinity between 33‰-34‰; temperature between 28⁰C-30⁰C and DO between 5 mg/l-8 mg/l. the light polluted territorial waters in the index span 10-30 and medium polluted between 30-55 and heavy polluted if greater than 55. prediction of model index is valid in Tanjung Emas bay area with pH condition 1-14, the temperature condition is less than or more than the natural span, turbidity ≥ 1 NTU then salinity condition is more or less than condition of natural salinity and DO between 1 mg/l to 8 mg/l.

Keywords : the liquid waste water of power plant, water quality, index

PENURUNAN NIKEL PADA LIMBAH INDUSTRI PELAPISAN LOGAM DENGAN MENGUNAKAN MEDIA ZEOLIT

Rien Anggraeni

Ir. Syafrudin, CES, MT

Nurandani Hardyanti, ST, MT

ABSTRACT

Metal coating industry, which is more grown up now, has negative environmental impact because of its waste water containing any kind of heavy metal especially nickel. Zeolite as media of ion exchange, may remove nickel concentration from metal coating waste water. The examination for capability of zeolite to remove nickel content is used by batch and resirculation column process. The Batch process uses zeolite with diameter 10-20 MESH and 20-40 MESH.

The highest efficiency of 97,483% is reached at zeolite with diameter 20-40 MESH, while recirculation column process is applied in column with diameter 2,54 cm when the concentration is 4 mg/l and flow rate variation at 30-450 ml/mnt. Nickel concentration can reduced until 0.1mg/l. It's reached when flow rate is 30 ml/mnt. Nickel concentration can reduce, so that can fulfill the standardization of waste water metal coated industry which limi thas 0.6 mg/l. The calculation gotten Reynold number is about 0,45-4,78 which still in the reynold range 0.016-1500. The relationship between Sherwood and Reynold number is $Sh = 4,53 NRe^{0.3896}$.

The reducing of nickel concentration use zeolit can be applied in the metal coating industry, so that can reduce the environmental pollution.

Keywords: *Ion exchange, zeolit, nickel, waste waste*

Abstract

Hight growth of Purwakarta townee without medium sanitation increase balance will make environmental quality degradation, especially contamination from domestic waste. If amount of Purwakarta townee in 2002 as much 131.355 with average growth 3,5 % a year and Purwakarta area still 11.292 Ha it means Purwakarta need a offsite system for wastewater treatment. Purwakarta waste water treatment serve 8 kelurahan with consideration of social economic, people density level, and regional topography. Chosen processing alternative is activated sludge by aeration basin because by using aeration basin will be get advantage technically, more economic, and better removal efeciency than by using Rotating Biological Contactor and Trickling filter. Waste Water Treatment Plant of Purwakarta have BOD effluent 20 mg/l and TSS effluent 20 mg/l wich as acording waste water stream that present by Keputusan Menteri Lingkungan Hidup no.112/2003.

Key word : *desaign, treatment, domestic wastewater, offsite*

**EVALUASI PENCEMARAN BOD-COD DAN PARAMETER FISIK DI KOLAM
PELABUHAN TANJUNG EMAS SEMARANG
DENGAN METODE INDEKS PENCEMARAN**

Agustin Fitriani

Haryono Setiyo Huboyo, ST, MT dan Sri Sumiyati, ST, Msi

Abstract

Coastal area are very productive region because many substance that came from surroundings can being accumulated on that area effect from human activity in this case from factory of electricity power station and domestic waste from around of the harbour that streaming down from Banjir Kanal Timur rivers. Impure BOD-COD caused by contaminant substance from Banjir Kanal Timur rivers. To earn to see territorial water quality in the harbour, index of territorial water quality are method to know amount of water contamination that effect from waste which step into water. Nemerrow Sumitomo Index applicable to assess quality of territorial water.

This research aim to evaluate territorial water condition in pool of Tanjung Emas Harbour Semarang using pollution index method with parameter pH, turbidity, DO, temperature, salinity, BOD, COD and to know about relation between BOD with physical parameter.

Research location at pool of Tanjung Emas Harbour Semarang limited by break water with length 1.097m, width 500m that what is long the than coast toward sea of both sides of port pool and long of horizontal with coastline.

Based on value of water quality Nemerrow-Sumitomo Index got by index of territorial water quality at port pool for maritime allotment tour equal to 3.42, for allotment of territorial water port equal to 3.43 and for allotment of sea ecosystem equal to 3.35. From the third allotment pool of Tanjung Emas Harbour Semarang enter in light impure category.

Keyword : BOD-COD, physical parameters, index of water quality

MODEL NUMERIK 2-D (LATERAL & LONGITUDINAL)
SEBARAN POLUTAN KONSERVATIF
(Studi Kasus: Sebaran Polutan Cadmium (Cd) di Muara Sungai Babon Semarang)

Badrus Zaman, Syafrudin, Adi Darmawan ^{*}

ABSTRACT

The condition of estuary of River Babon is very influenced by the condition around its river stream. The estuary of River Babon also becomes waste disposal channel of Kawasan Industri Terboyo Semarang (KITS). The pollutants, whether direct or indirectly earn to step into estuary. Cadmium (Cd) as one of heavy metal pollutant and the conservative element will reach a certain spreading pattern at estuary. To know the cadmium spreading pattern, sampling is taken at the center of estuary to the seaward. Sampling is taken twice with one hour time interval. Model is used as a tool to know the Cd spreading pattern. It is needed to build a 2-D numerical model (lateral & longitude). The model uses governing equation based on hydrodynamic processes of the water and conservative pollutant transport. The equations can be solved numerically by using finite difference scheme. Result of research that have been conducted, known that concentration of Cd at estuary of river Babon in a range of 0,009 - 0,017 mg/l, where the concentration have exceeded water quality standard value, in this case based on Minister of Environment Regulation No. 51 year 2004 about Sea Water Quality for Ocean Organism, which is equal to 0.001 mg/l. From the output of the model for 1 hour time interval, obtained by value with error to field data equal to 3.028%. By using the model, we could know how the spread of pollutant accurately, quickly and cheap relative so that picture from the model earn made basis for the furthermore estuary management.

Keywords: estuary, Cadmium (Cd), spreading pattern, numerical model.

RENCANA PENGEMBANGAN SISTEM DISTRIBUSI AIR BERSIH KAWASAN UTARA KOTA SURAKARTA

WARNINGSIH, Ir. Mochtar Hadiwidodo, Ir. Theresia, MSi

ABSTRACT

Sukaregang Area in Garut District is one of the area developed to be the central of small industries (CSI) of tannery since 1920. The handling of tanneries wastewater contamination are by developing wastewater treatment instalation (WWTI) and developed service zones, and the WWTI has only built in Zone 1 and 2 with the capacity of 300 m³/day and 400 m³/day. The lach of land to build another WWTI, has made the government to increase the service of Zone 2 WWTI, which now not operated. Operationalization of Zone 2 WWTI for the increase of it service needs to consider the changes of the wastewater quality and the quantity characteristics. The results of wastewater characteristics measurement from several tanneries in Zone 2, are the increase of the average wastewater flow into 508,94 m³/day and the dominant parameters of the mixed wastewater quality from several production processes of common tanneries are BOD, COD, TSS, and heavy metal Chrom. The assesment to the suitability of the existing WWTI capacity for the update treatment loading results the recomendation of selected design as the addition of the capacity of the equalization unit, the changes of the existing coagulation unit into Chrom reduction-precipitation units, and the modification of sedimentation unit to increase the laminarity and to decrease flow turbulence, in other hand the exsiting biological treatment unit is kept considering the operation parameters value still full-filled the criteria, through sludge recirculation adujstment.

Keywords : tannery, wastewater treatment, assesment, recommendation.

**RISK ANALYSIS HEAVY METAL CR AND CD CONTAINS FROM EFFLUENT TEXTILE
INDUSTRY ON CIVILIAN'S WELL
IN SAWAHAN AND SEMBUNGAN VILLAGES, JATEN AREA,
KARANGANYAR DISTRICT
(CASE STUDY)**

Aulia Dian Fiquraisin, Ir. Nasrullah, MS, M. Arief Budiharjo, ST, MEng. Sc

ABSTRACT

Effluent Waste product which produced by textile industry contains chemicals derivatives including heavy metal. Effluent Textile industry waste product run to rivers and paddy's field and then absorbed to civilians well in Sawahan and Sembungan Villages, Jaten Area, Karanganyar District. There are four steps in risk analysis research. There are hazard identifications, exposure assesment, toxicity assesment, and risk characterization. Hazard identification on Cr and Cd heavy metal parameter show that maximal effluent concentration of waste product textile industry for Cr is 1,24 mg/l and Cd = 0,007 mg/l. Exposure assesment step show that Cr concentration in Sawahan Village in five to seven sample point more than maximal concentration which tolerate according to PP No.82 Tahun 2001 is about 0,05 mg/l and according to EPA is about 0,1 mg/l. Cd concentration in Sembungan Village in one, eight, nine and ten sample point more than maximal concentration which tolerate according to PP No.82 Tahun 2001 is about 0,01 mg/l. Toxicity assesment show that intake Cr heavy metal on man and woman in Sawahan Village in five to seven sample point more than maximal intake which tolerate according to PP No.82 Tahun 2001 is about 0,0014 mg/kg.day and according to EPA is about 0,0028 mg/kg.day. Intake Cd heavy metal on man and woman in Sembungan Village in one, eight, nine and ten sample point more than maximal intake which tolerate according to PP No.82 Tahun 2001 is about 0,00028 mg/kg.day. Risk characterization result show that in point five to seven sample in Sawahan village Cr and Cd value is more than one. That means the wells is danger to consume. In Sembungan village, the value risk Cr and Cd in point one, eight, nine and ten is more than one. That means the wells is danger to consume too.

Key words: effluent textile industry, Cr and Cd heavy metal, risk analysis, hazard identification, exposure assesment, toxicity assesment, and risk characterization.

**DISAIN INSTALASI PENGOLAHAN LIMBAH CAIR
RUMAH SAKIT ROEMANI SEMARANG**

S u c i p t o, Ir. Mochtar Hadiwidodo, Ir. Trijoko, MSi

THE EFFECT OF VELOCITY GRADIEN AND F/M (Food/Mass) RATIO TO SVI (Sludge Volume Index) IN ACTIVATED SLUDGE SYSTEM

Novieta WI, Sudarno, Junaidi

Abstract

The objective of biological wastewater treatment is to tranform dissolved, colloid, and suspended organic matter in wastewater to be biofloc. Charactiristic of floc will influence to performance of activated sludge processes. The settling characteristic activated sludge are sludge Volume Index (SVI). The objective of this research are to know the effect of velocity gradient and F/M ratio to SVI value.

activated sludge system consist of aeration tank volume 5 l and clarifier tank volume 2, l were used in this research. Concentration of organic matter that used in this research are 1014.92 mg/l and 507,46 mg/l. The independent variable of this research are F/M ratio(g COD/g MLSS.day) : (0.0001-0.12), (0.12-0.24), (0.24-0.36), (0.36-0.48), (0.,48-0.60) and Velocity gradient: 63,29, 116,60, 161,98, 217,17 second⁻¹.

The result of this research are velocity gradient 116,60/s and ratio F/M (0.48-0.6) (g COD/g MLSS.day) result the most lowest SVI value. Deflocculation in biological floc is caused by velocity gradien more then 116.60/s. Higher SVI value when F/M ratio less then 0.2(g COD/g MLSS.day) is caused by filament growth. High SVI value result high COD concentration in effluent and low efficiency COD removal in activated sludge system.

Key Word : Velocity Gradient, Activated Sludge, F/M ratio, SVI

**PENGARUH RASIO C/N DAN WAKTU REAKSI TERHADAP EFISIENSI
PENYISIHAN KARBON DAN NITRIFIKASI PADA SBR AEROB**

BETTY RAHMAWATI, Sri Sumiyati ST, MSi, Junaidi, ST

REDESAIN INSTALASI PENGOLAHAN LINDI TPA BENOWO SURABAYA

Meilani Saintifika¹, Ika Bagus Priyambada², Wiharyanto Oktiawan²

ABSTRACT

Leachate treatment is a part of an integrated and environmentally solid waste treatment problems which could never be separated from them. Benowo landfill is the only solid waste landfill to Surabaya's people, which is placed in the center area of Benowo's potential shrimp and salt embankment. Leachate treatment plant which has built in Benowo landfill is expected to be able to treats leachate well even if safe for the environment. But the actual fact and the design evaluation show that the discharge of leachate have not meet the requirements of the wastewater treatment regulation on SK Gubernur Jawa Timur No 45 Tahun 2002 Tentang Baku Mutu Limbah Cair Bagi Industri atau Kegiatan Usaha Lainnya ; especially for five major parameters, which are include : TDS (12195 mg/L), COD (2000 mg/L), BOD (840 mg/L), oil & grease (127,50 mg/L), and N (629,51 mg/L). Therefore, redesign of Benowo leachate treatment plant have to be done in order to minimizes the environmental problems which may be arisen. The redesign proccess of Benowo leachate treatment plant will be done by using several steps as follows : 1)evaluation and analysis of leahate quantity (leachate flowrates), 2)evaluation and analysis of leahate quality, 3)evaluation and analysis of pollutants removal procentation in each treatment unit, 4)evaluation and analysis of leachate treatment plant existing design condition, 5)optimation alternatives and improvement recommendation for each treatment unit. Benowo leachate treatment plant which has been redesigned must be able to treats leachate so that the leachate effluent discharge can be met the wastewater regulation on SK Gubernur Jawa Timur No 45 Tahun 2002 Tentang Baku Mutu Limbah Cair Bagi Industri atau Kegiatan Usaha Lainnya.

Keywords : leachate, leachate treatment plant Benowo, redesign, wastewater quality standard.

**F/M (Food/Mass) RATIO INFLUENCES AND
DO (Dissolved Oxygen) CONCENTRATION TO
MICROORGANISM'S FILAMENT GROWTH AND COD REMOVAL
IN ACTIVATED SLUDGE PROCESS
(GLUCOSE WASTEWATER PRODUCT CASE STUDY)**

Narryras Trisnawati, Nurandani Hardyanti, ST, MT, Junaidi, ST

Abstract

Activated sludge process is an aerobic biology process. This process is functioned to treat waste water by bacteria helped as its food. F/M ratio and dissolved oxygen (DO) concentration has a big influence to filament microorganism growth in activated sludge process. It because there are exaggerates growth which causes bulking sludge. High SVI value indicates bulking sludge. The aim of this research are to know the influences of F/M ratio and DO concentration to microorganism's filament growth and COD removal in activated sludge process. This research is using reactors which consist of 5 liters volume aeration tank and 2,5 liters volume clarifier tank. Waste product which is used is 534,24 mg/l. COD concentration artificial glucose waste water product. The independent variable of this research are F/M ratio(g COD/g MLSS.day) : (0,10-0,24), (0,24-0,38), (0,38-0,52), (0,52-0,66), (0,66-0,80) and DO concentration (mg/L) : (0,5-1), (1-1,5), (1,5-2), (2-2,5), (2,5-3). According result of this research, the best SVI's value is 47,83 mL/g which happened at DO concentration (2,5-3) mg/L and F/M ratio (0,38-0,52) g COD/g MLSS.day. High SVI value in low F/M ratio, possibility caused by microorganism filament present. High SVI value caused effluent COD concentration decrease which caused reducing COD efficiency in activated sludge system.

Key Word : DO Concentration, Activated Sludge, SVI, F/M Ratio, Microorganism Filament.

**DETAIL DESAIN DRAINASE BANDAR UDARA INTERNASIONAL AHMAD YANI
SEMARANG**

Mokh. Anry arifudin, Ir. Endro Sutrisno, MS, Ir. Winardi Dwi N, Msi

**ANALISIS KEMAMPUAN ADSORPSI
TANAH JENIS LEMPUNG (*LOAM*) TERHADAP
TEMBAGA SEBAGAI BAHAN AKTIF PESTISIDA
PADA LAPANGAN GOLF**

HERDIANA KUSUMANINGRUM

Ir. Syafrudin, CES, MT dan Dra. Suparni Setyowati Rahayu, MSi

ABSTRACT

The used of pesticide contains copper (II) as an activated material on a golf field can cause ground water pollution. Copper as the largest composition on the activated material in pesticide is a toxic and hazardous compounds therefore this research is needed to find out the adsorption capability of soil with copper as contaminant. The research is done in a laboratory scale with two (2) phases which is, batch and continues columns. Batch experiment is to analyse adsorption capability of soil with copper as contaminant in a static condition. Freundlich and Langmuir isotherm is used to process the data. Continues columns is used to measure soils's adsorption capability on copper in a dynamic condition by using piled-up soil. This experiment is done on varies of debits and influent concentration. Adsorption capabilty of soil in the batch experiment will follow the Freundlich equation, while continues columns will follow the Thomas equation. The research shows that clay soil (loam) on the Candi Semarang Golf Club (CSGC) has a good capability in setting aside copper in the pesticide wich have removal efficiency of copper about 98,20% on the batch experiment and 98-100% on the continues columns. Continues columns experiment show that the optimum adsorption capacity is in condition of debits 40 ml/day and influent concentration 30 mg/l which is 37 days to get an exhaustion conditions. Besides that coefficient distribution (K_d) of soil about 128,8 l/Kg and retardation factor about 5,88. The conclusion is there is a very small possibility that the ground water will be contaminated by copper as the active material in pesticide.

Key word: adsorption, soil, copper.

STRATEGI OPERSIONAL SBR(*SEQUENCING BATCH REACTOR*) SECARA AEROB-ANAEROB PADA PENYISIHAN KARBON DAN NITROGEN

SUPRIYATIN

Wiharyanto Oktiawan, ST, MT dan Junaidi, ST

Abstract

In Biological wastewater treatment by using SBR occurs removal carbon and nitrogen on the system. The removal carbon and nitrogen are influenced by the strategy of operational and ratio C/N. This research purpose to decide strategy of operational aerobic-anaerobic and ratio of C/N removal of carbon and nitrogen.

In research was used reactor from plastic material with diameter 25 cm and high is 25 cm, volume of wastewater in reactor is 5 liter and volume of sludge is 35% from volume of wastewater that 1,75 liter. Waste that used was artificial waste glucose soluble with 1013.9 mg/l concentration of COD. As independent variable are strategy of operational: (aerobic-anaerobic; aerobic-anaerobic, aerobic-anaerobic; aerobic-anaerobic, aerobic-anaerob, aerobic-anaerobic) and ratio of C/N (100:5, 100:15, 100:30, 100:45, 100:60), if dependent variable are removal of carbon and nitrogen.

As the result this research shows that the finest of carbon removal is occurred in strategy of operational aerobic-anaerobic, and ratio of C/N (100:5) is 97.93%..

The finest removal of nitrogen on form ammonia is occurred on strategy of operational aerobic-anaerobic, aerobic-anaerobi, aerobic-anaerobic, and ratio of C/N (100:5) is 98.04%.

Keywords: strategy of operational, ratio of C/N, Sequencing Batch Reactor, removal of carbon, removal of nitrogen

**DETAIL ENGINEERING DESAIN
SISTEM PENYALURAN AIR BUANGAN DAN INSTALASI PENGOLAH AIR LIMBAH
KELURAHAN PANGGUNG KIDUL
KECAMATAN SEMARANG UTARA**

JOKO SUTA'AT
Ir. MOCHTAR HADIWIDODO dan HARYONO S. HUBOYO, ST.MT

**PENGOLAHAN SECONDARY SLUDGE DENGAN PROSES BIOLOGI
ANAEROB SISTEM TERLEKAT MENGGUNAKAN MEDIA PLASTIK
(STUDI KASUS PT. JABABEKA INFRASTRUKTUR, JAKARTA)**

Sri Elda Mariani

ABSTRACT

Secondary Sludge is high concentrated organic wastewater. It can be treated by biological anaerobic process. Research of the secondary sludge wastewater treatment was done in a 10,5 L anaerobic reactor. The influent contains 21.225 mg/L to 23.500 mg/L of total solids and 14.600 mg/L to 17.200 mg/L COD. Independent variable is flow rate, which consists of 1 L/d, 1,5 L/d, 2 L/d, and 3 L/d. Wastewater pollutants which are being researched are Chemical Oxygen Demand (COD), Total Solids (TS), Total Volatile Solids (TVS), Suspended Solids (SS) and Volatile Suspended Solids (VSS). By the 2 L/d volume, degradation process in the reactor reached maximum value with up 50 % efficiency of degradation and the loading rate generated maximum and stable condition. The efficiency of degradation presented by the decreasing of COD, TS, TVS, SS and VSS concentrations, the values are 53.13%; 51.07%; 48.36%; 61.65% and 58.45%.

Key word : *Secondary Sludge, Anaerobic Biological Treatment, Attached Growth, Plastic Media.*

**PENGARUH GRADIEN KECEPATAN DAN SRT (*Solid Retention Time*) TERHADAP
SVI (*Sludge Volume Index*)**

PADA PENGOLAHAN BIOLOGI LUMPUR AKTIF

Faustine Ike Widhiastuti

Sudarno, ST, MSc dan Junaidi, ST

ABSTRACT

The objective of biological treatment activated sludge is to remove or reduce the concentration of organic compounds with bacteria. One of the factor successfully activated sludge is the floc formed with low SVI range (50-100 ml/g). Floc formation in aeration tank are affected by velocity gradient and Solid Retention Time. The objective of research is to know the affect of velocity gradient and Solid Retention Time to SVI and concentration of COD effluent.

This research use reactor which consist of aeration tank (volume 5 liter) and clarifier tank (2,5 liter). Wastewater is artificial, which contain glucose liquid and concentration of COD is 1062,5 mg/l. As independent variable are Solid Retention Time (0-5), (5-10), (10-15), (15-20), (20-25) day and (20-60), (60-100), (100-140), (140-180) second¹.

The result of research are the best SVI occur at SRT 10-15 day and 60-100 second¹. At velocity gradient above 100 resulting high SVI because of deflocculation. High SVI at SRT 0-5 day may be because of low production of biopolymer. Deflocculation. And long SRT resulting high concentration of COD effluent

Key words: activated sludge, SRT, velocity gradient, SVI, COD

TEKNOLOGI PENGOLAHAN LIMBAH CAIR ELEKTROPLATING KHROM DALAM UPAYA MENGAMBIL DAN MEMANFAATKAN KEMBALI LOGAM KHROM DENGAN METODA ELEKTROLISA

Robby Sukwadi, M. Arief Budihardjo, ST, Meng.Sc, Dra. Suparni Setyowati Rahayu MSi

ABSTRACT

Chrome waste in form Cr^{6+} is one of waste water which very dangerous and toxic characteristic because include in list of B_3 waste. Final concentrarion of Cr^{6+} in wastewater at electroplating industry area Bajomulyo village still high that is 20 mg/l. The aim of this research is takingan reuse chrome metal which is left in waste chrome water, in order to final result of Cr^{6+} less and fullfill quality standart waste water of electroplating industry and reuse for proccess.

The research with electrolisis method is done by recycling electroplating chrome waste water that is used as electrolyte. That electrolyte is flow many current that are through 2 electrodes, Pd as anode and cuprum as cathode with definite voltage. The processes is done with 3 variation, that are Cr^{6+} concentration, time and current. Research result, we obtain the best operation condition of chrome waste water treatment, that are during 50 minutes with 25 Ampere. At those condition could remove 98.605% . The concentration of Cr^{6+} effluent is 0.14 mg/l, and comply with waste water quality standard for electroplating industry (0.3 mg/l).

Keywords : Electroplating, Elektrochemistry, Electrolysis, Oxidation, Reduction, Anode, Katode

**UJI KEMAMPUAN ABU SEKAM PADI SEBAGAI MEDIA ADSORPSI UNTUK
MENURUNKAN KADAR SENG (Zn) DARI LIMBAH CAIR INDUSTRI GALVANISASI
LOGAM**

Prima Anindratia

Dra. Suparni Setyowati Rahayu, MSi dan Junaidi, ST

Abstract

Activities of industry which keep increasing have positive and negative impacts. One of the negative impact is waste water; as an output from production processes. The sewage of residue galvanization process needs to be turned to reduce the level of metal before its go into the waters. The purposes of this research are analyzing zinc removal by rice husk ash, examining capacity of rice husk ash adsorption, calculating the velocity constanta value and capacity rice husk ash to zinc. The method is laboratorium analysis method which consists of two stages. The stages are batch and column. Batch process is made with the grain size and weight of media as variations. Column process is made with the concentration value as variation. The batch result shows that the ash in $ES = 0.270$ mm has the highest removal efficiency. The last concentration of zinc in those size is $0.473 - 0.863$ mg/l. The last removal efficiency of zinc in those size is $78.425\% - 88.175\%$. The column test result shows that $k_1 = 23.21$ ml/mg.dtk and $q_0 = 1.956 \times 10^{-6}$ mg/mg for $C_0 = 5$ mg/l; and $k_1 = 15.4$ ml/mg.dtk and $q_0 = 2.099 \times 10^{-6}$ mg/mg for $C_0 = 6$ mg/l.

Keyword : adsorption, breaktrough curve, batch process, column test.

PENGARUH DOSIS KOAGULAN
JENIS *POLY ALUMINIUM CHLORIDA* (PAC)
TERHADAP PENURUNAN INTENSITAS WARNA AIR GAMBUT
DI KECAMATAN GAMBUT KABUPATEN BANJAR KALIMANTAN
SELATAN

Moh. Khoirulloh
Ir. Syafrudin, CES, MT dan Ir. Nasrullah, MS

ABSTRAK

**PENGARUH LAMA KONTAK DAN TINGKAT UMUR TUMBUHAN ECENG
GONDOK (Eichhornia crassipes (Mart), Solms) TERHADAP
KADAR AMMONIA DALAM AIR LIMBAH
RS.PANTI WILASA CITARUM
SEMARANG**

Wahyani Majidi, Badrus Zaman, ST, MT, Ir. Endro Sutrisno, MS

PENGARUH WAKTU STABILISASI PADA SEQUENCING BATCH REACTOR (SBR) AEROB TERHADAP PENURUNAN KARBON

Diah Tri H, Sri Sumiyati, Junaidi

Abstract

One of biological wastewater treatment process modification Sequencing Batch Reactor by exploiting period of stabilization time earn to lessen capacities of total aeration volume. Mechanism that happened in this SBR modification same as that happened in Contact Stabilization. There was existence process biosorption, was due to adsorption of the organic matter onto sludge particels, during the contact period (fill - react time). This research aim to know influence of stabilization time to degradation of COD.

This research, used SBR reactor with volume operate for 5 Liter with COD influent concentration 1139.2 mg/L. The variation of stabilization time : 3, 4, 5 and 6 hours and time reacted : 0,5 ; 1 ; 1,5 and 2 hours as independent variables. COD effluent concentration as depended variable.

Result of research indicate that progressively time of stabilization and concentration COD (mg/L) will experience of efficiency improvement. Time reacted to give influence the happening of biosorption (the adsorption of organic matter onto sludge particel). The fenomena that happened is degradation of concentration COD will achieve maximum level at the total contact time 1,5 hour. Efficiency of optimum degradation COD become of variation $r/s = 1 : 6$.

Keyword : SBR Aerob, stabilization time, COD

**DETAIL ENGINEERING DESAIN (DED) INSTALASI PENGOLAHAN AIR LIMBAH
(IPAL) DARI PROSES DIECASTING
DI PT. YAMAHA INDONESIA MOTOR MANUFACTURING (PT. YIMM)
KAWASAN INDUSTRI PULO GADUNG
JAKARTA TIMUR**

K A S M A N

Ir. Mochtar Hadiwidodo dan Wiharyanto Oktawan, ST, MT

ABSTRACT

As rapidly demand for motorcycle in domestic and overseas consumers, PT. Yamaha Indonesia Motor Manufacturing (YIMM) should increase its production capacity per year so that increase waste water generation. WWTP # 4 building 11 had treat waste water from painting rinsing waste from building #11 and die casting waste from building 9. Based on feasibility study of PT. YIMM that needed a separated WWTP to treat waste water from building 9 (diecasting process) by 116 m³/day flowrate. Die casting process generates waste water that has characteristic BOD₅ 1745 mg/L, COD 3465 mg/L, TSS 750 mg/L, Nickel 11,8 mg/L, lead 9,05 mg/L Ammonia 12,4 mg/L and grease/oil 341 mg/L. grease/oil separator unit is needed beside metal could be removed by precipitation, sedimentation also is needed after koagulation flocculation to suspend TSS. Biological process that installed is anaerob-aerob submerge biofilter system. Netralization need after sedimentation to adjust pH 7,5 as pH optimum of bacteria on biofilter system. Design consideration is based on influen wastewater characteristic so that the effluen is according to the present regulation requirement in Jakarta, SK Gub DKI Jakarta No. 582/199. Investation for this project is Rp 1. 457.000.000,00 (a billion four hundred and fifty seven million rupiahs).

Key word : waste water, die casting, precipitation, biofilter anaerob-aerob

DETAIL ENGINEERING DESIGN OF WASTEWATER TREATMENT PLANT IN TAHU TEMPE INDUSTRIAL CENTER DUWET DISTRICT GOVERNMENT PEKALONGAN CITY

M Nur Salim¹, Wiharyanto Oktiawan², Endro Sutrisno³

ABSTRACT

Wastewater waste which does without treatment before in tahu tempe industry, often raised the effect to environment destruction. There are 66 producer of tahu tempe in Duwet District Government, Pekalongan City who capable to produce tahu tempe in total 2000 kg/day with 40000 L/day wastewater debit. It is need an accurate and simply wastewater treatment plant in lower social economical grade which have Rp 16.000,00/day of production incoming.

In the step of detail engineering design of wastewater treatment plant in tahu tempe industrial center, Duwet District Government, Pekalongan City include design area identification and also design area choosing, sewer and treatment system analysis, and also wastewater sewer and treatment net design. The arranged treatment design is an biologic anaerobic baffled system with suspended microbiological system called ABMFT and followed by next biologic aerobic treatment using wetland cell. Beginning with 5110,5 mg/L of wastewater concentration COD and 3475,1 mg/L BOD and 2980 mg/L for TSS, expected to be decrease until 38,352 mg/L of COD; 26,0625 mg/L of BOD and 83,44 mg/L of TSS. There for, the efficient decrease will become 99,25% of COD and BOD and 97,2% of TSS. Detention time in anaerobic baffled unit are 10 days and 4,26 days for wetland cell unit, while the standard quality which used No 10th 2004 Region Regulation of Central Java Province and for the cost arrangement of this wastewater treatment plant is Rp 1.269.217.000,00

Key words: Tahu Tempe Industry, COD, BOD, TSS, ABMFT, Wetland Cell

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ADVANCED OXIDATION PROCESS APPLICATION IN REDUCING COLOUR IN TEXTILE WASTEWATER BY USING OZONE AND HYDROGEN PEROXIDE

Setyo Prabowo, Alm. Widiastuti, Sri Sumiyati

ABSTRACT

Until recently, the colour of textile waste remains a problem in aesthetically. Generally, Indonesian textile uses organic colour essence, type azo. The type of azo colour that is used by textile industries in Jababeka is red dyes. During this time conventional treatment such aeration, sedimentation, could not eliminate colour essence of textile waste yet. The goal of this research is to decrease colour concentration of textile waste by analyzing how far the parameters such as temperature, air source, pH, concentration of hydrogen peroxide influence the ozone and hydrogen peroxide.

The research is based on a theory that the concentration of textile waste colour can be decreased by using ozone and hydrogen peroxide that are adjusted with air source, waste temperature, concentration of hydrogen peroxide and pH of the waste. This research uses colour concentration as the dependent variable where as air source, temperature, pH, hydrogen peroxide volume, times and pH of waste are the independent variables. The initial concentration of waste colour can be decreased from 3700 mg/ltr to 80 mg/ltr (97.8 %) by using 3 litre per minutes of flow rate, 2 kg/cm² of pure oxygen of pressure, pH 7.90, 70⁰C of temperature, 1.25 ml concentration of hydrogen peroxide. The result of this research points out that the waste colour seems clear enough visually.

Key words : colour essence, textile waste, ozone, hydrogen peroxide

PERANCANGAN SISTEM PENYALURAN DAN INSTALASI PENGOLAHAN AIR LIMBAH TERPADU PADA SENTRA INDUSTRI PERIKANAN TEGALSARI KOTA TEGAL

DIAH AYU WULANDARI S.

Haryono Setiyo Huboyo, ST, MT dan Ir. Nasrullah, MS

ABSTRACT

Tegal City is one of maritime city in Indonesia, where fishery industries that generally small scale until medium scale covered along the beach. That industries made wastewater that along time throw directly into the sea water. Same with a the other industries, fish processing also made wastewater that contain the contaminant whether in colloid or particulate. Beside that, there is also some key parameters likes pH, Total Suspended Solid (TSS), high chloride concentration, phosphate, also the odours, are almost the concentration of the parameters will give the environmental problem if throw directly without any treatment.

The Government of Tegal City plans, will build the area for the centralization of Fishery Industry, where that place will build in the east of PPI Tegalsari in Kelurahan Tegalsari, Tegal City. That industries divided into two big community, are salting fish industries and filleting fish industries. With relocated that industries, hopes the handling of environment will come easier. For handling the wastewater problem, especially wastewater which from the activity industries, The Government also plans will build the Installation of Wastewater Treatment of fishery industries.

Amount of the flow of the wastewater accounted based from the amount of cleans water that used with the industries which will relocated. Analyzing the wastewater shows that several parameters are up to the standard and must be treated, they are TDS = 83678 mg/l, TSS = 6985,54 mg/l, Nickel = 1,12 mg/l, Sulphide = 1,22 mg/l, BOD = 1570 mg/l, COD = 6582,74 mg/l, and chloride = 56628,42.

Depend on that parameters, then designed the installation of wastewater treatment that suit with. After analyzing, the installation has chosen, that are primary sedimentation, coagulation-flocculation, chemical precipitation, activated sludge, anoxic tank, clarifier, and sludge drying bed. After passed the installations, then the quality of wastewater treatment be TDS = 72535,14 mg/l, TSS = 39,99 mg/l, Nikel = 0,1585mg/l, Sulfida = 0,05 mg/l, BOD = 39,99 mg/l, COD = 195,73 mg/l, dan klorida = 56628,42, dan total nitrogen = 266,91 mg/l. For the chloride was not treated, because the outlet of the wastewater treatment is throw into the sea. But because treating the wastewater with high chloride concentration, then halophilic bacter was used, which added into activated sludge treatment.

Keywords : Designs, salinity, activated sludge, fishery industry

EVALUASI SISTEM PENGOLAHAN LINDI TEMPAT PEMBUANGAN AKHIR SAMPAH (STUDI KASUS : TPA JATIBARANG)

Eko Wibisono¹, Mochtar Hadiwidodo², Dwi Siwi Handayani³

ABSTRACT

Leachate is an integral part of the solid waste. Jatibarang solid waste landfill is the only final disposal site in Semarang which is located on the hills area near the District of Mijen and District of Ngaliyan of Semarang. The leachate treatment plant in Jatibarang solid waste landfill is supposed to be able to treat leachate properly to avoid polluting the surrounding area. However, the fact and the design evaluation shows that the treated leachate of Jatibarang solid waste landfill leachate treatment plant is still exceeding the quality standards stated in Peraturan Daerah Propinsi Jawa Tengah Nomor 10 Tahun 2004 about the quality standards of waste water for industrial and other commercial activities, especially in 4 parameters of pollutant i.e. TSS (190 mg/l), TDS (5620 mg/l), BOD (1554 mg/l) and COD (3852 mg/l). Therefore, the evaluation process and recommendation of Jatibarang solid waste landfill leachate treatment plant renovation are needed in order to reduce the pollutants in the leachate. So it can be safely dumped in the receiving water stream. The treatment units in the existing leachate treatment plant are bar screen, anaerobic pond, aeration pond, sedimentation pond 1, sedimentation pond 2 and sedimentation pond 3. The evaluation process of Jatibarang solid waste landfill leachate treatment plant is conducted in several stages, i.e. 1)evaluation and analysis of leachate quantity (discharge) data, 2)evaluation and analysis of leachate quality, 3)evaluation and analysis of pollutant removal percentage in each treatment unit, 4)evaluation and analysis of existing leachate treatment plant design, 5)recommendation of each treatment unit. The evaluation and recommendation are expected to improve the leachate treatment so that the treated leachate / effluent will not exceed the quality standard stated in Peraturan Daerah Propinsi Jawa Tengah Nomor 10 Tahun 2004 about the quality standards of waste water for industrial and other commercial activities and will be safe to be dumped into the river.

Keywords : *leachate, Jatibarang Solid Waste Landfill Leachate Treatment Plant, evaluation and analysis, waste water quality standards.*

Hubungan Konsentrasi Nitrat terhadap Perubahan Parameter COD di Sungai Progo

Edho Surya AB, Ir Endro Sutrisno, MS, M. Arief Budihardjo, ST. MEng. Sc

ABSTRACT

Along as increasingly the many agricultural lands, settlement, industries activity and other people activity that passed by Progo river hence will also contributes in influencing the water quality of Progo river as a whole. This is because the activity yields waste into that river body. One of that waste which is in this river body is Nitrat (NO_3^-). Nitrate produced from many agriculture waste as result of nitrous fertiliser used as well as from domestic wastes and industries. In water territory, concentration of Nitrat can be used as nutrient for aquatic plant so that if nitrate rate is excessive in water territory, hence can cause the happening of eutrophication or blooming algae so that it will lessen oxygen rate in water territory. The lessen of this dissolved oxygen rate then will also influence rate of COD in the water territory. The purpose of this research is to know relation between concentration of Nitrat with concentration of parameter COD in Progo river and analyses relationship gotten if compared to the book review. This research done in Progo river especially that residing in the province of Central Java that passing two towns and one county that is Magelang city, Magelang county and Temanggung city. This research applies secondary data from Bappedal Jawa Tengah and DPLH Kota Magelang in the year 2004. Independent variable in the form of concentration of Nitrat (NO_3^-), while dependent variables in the form of concentration of COD. The result of this research which is got that statistically relation between Nitrat (NO_3^-) with COD doesn't significant and the influence of Nitrat is not dominant and with r value = 0,29 and value r^2 = 0,0841. From the comparison of relationship that gotten with the book review hence it got result that parameter Nitrat (NO_3^-) in this research only have a little effect on to parameter COD because not happened eutrophication in the river body.

Keywords : Nitrat and COD

Pengolahan Mixed Sludge dengan Complete-Mix Suspended Growth Anaerobic Digester

Meilia E, Wiharyanto Oktawan, ST.MT., Ir.Irawan Wisnu W, MS.

Abstrack

One of the alternative ways in waste processing which have organic materials with high concentration is anaerobic process. Not only can reduce organic materials content, but process of anaerobic also produce biogas which can be used as the alternative of energy. Research conducted by sludge mixed (the comparison of sludge primary and secondary sludge is 1:2) using complete-mix suspended growth anaerobic digester with volume 12 liters. Sludge which in processing have value of total solid 28,4-34,2 mg / L with 50 % of its is in volatile solid. 35% of SS values represent organic materials which condense at 600°C (VSS). Concentration of COD between 30,5-32 mg / L. Free Variable in this research is processing volume which are 0,5 l / day, 1 l / day, 1,5l / day and 2 l / day. While the parameter of waste material are perceived COD, TS, TVS, SS and of VSS. Processing volume at 1,5 l / day with hydraulic retention time 8 day, degradation process in reactor have optimum condition. The efficienci at a COD volumetric loading rate of 4 g COD / l.day is equal to 56%. The efficienci at a TS volumetric loading rate of 4.28 g TS / l.day, is equal to 47%. The efficienci at a TVS volumetric loading rate of 1.88 g TVS / l.day is equal to 38%. The efficienci at a SS volumetric loading rate of 4.11 g SS / l.day is equal to 54%. The efficienci at a VSS volumetric loading rate of 1.79 kg VSS / m³.day is equal to 43%.

Key words : mixed sludge, anaerobic digester, complete-mix suspended growth, biogas

**EVALUASI ALAT PENGENDALI PARTIKULAT
WET SCRUBBER
PT BINA GUNA KIMIA SEMARANG
YUSA EKO SAPUTRO**

**DESAIN INSTALASI PENGOLAHAN
LIMBAH CAIR PASAR REJOMULYO, SEMARANG TIMUR SEMARANG**

Fajar Diyan Dwi Asih, Ir. Dwi Siwi Handayani, Ir. Endro Sutrisno, MS

ABSTRACT

Rejomulyo traditional market has special character that is not common to any other. There are some activities not only for trading fish, and poultry but also poultry slaughter. Unit of poultry slaughter generates waste water that is potential causing environment pollution. Characteristic for waste water with debit of 468,48 m³/day are pH 6,43; 1632,3 mg/l of COD; 0,36 mg/l of oil and grease; 352 mg/l of TSS; and 41x10⁷ MPN/100ml of total coliform. Concentration value that exceed from the waste water effluent standard are COD, TSS and Total coliform. To reduce or eliminate those pollutants, suitable waste water treatment is needed. Sedimentation unit for reducing TSS and biological system with anaerobic-aerobic biofilter for COD can be set up to solve the problem. Complete process for this waste water treatment consist of some stages from equalization chamber, first sedimentation chamber, biofilter anaerob-aerob, second sedimentation chamber, and disinfection. The alternatives of unit operation are based on influent and efficiency in treatment. So that the effluent of waste water can be safely remove and lower than standard waste water effluent in Semarang, which is Province Regulation No.10 th. 2004 about the standard of Slaughter House Industry Waste also standar Waste Water for Industrial and Other Activities that similar but has no standard yet. according to this regulation the characteristic of solid waste should be lower than 250 mg/l for COD, 5 mg/l for oil and grease, 125 mg/l for TSS, 5000 MNP/100ml for total coliform and pH around 6-9.

Key words: waste water, characteristic of waste water, anaerobic-aerobic biofilter

**PENURUNAN KADAR BOD, COD, DAN TSS
LIMBAH PABRIK TAHU DENGAN METODE OZONASI
(Studi Kasus Pabrik Tahu Sari Putih Klaten)**

Bima Patria Dwi Hatmanto^{*)}, Junaidi^{)}, Isyuniarto^{***)}**

STUDI KELAYAKAN PENGELOLAAN AIR LIMBAH DOMESTIK DENGAN TEKNOLOGI UASB DAN DHS DI PERMUKIMAN KOTA WILAYAH KECAMATAN BOGOR UTARA KOTA BOGOR

Agus Rifai, Endro Sutrisno¹⁾, Wiharyanto Oktiawan¹⁾

ABSTRACT

Domestic wastewater is one of the potential sources of environment pollution. This matter proven that 70% river contamination in Jabodetabek cause of domestic waste. Therefore wastewater need be treatment before thrown to river. Problem which often emerge in management of domestic waste is the limited land area and existing fund to built facility wastewater treatment and also the expensive of operating cost. To overcome mentioned need developed wastewater treatment technology of cheap with high efficiency, easy to operate and also should be compact. Combination technology of Upflow Anaerobik Sludge Blanket (UASB) and Downflow Hanging Sponge (DHS) representing economic wastewater treatment, easy to operating and the high efficiency that is 98% for BOD and 99,8% for the bacterium. Therefore, to shown wastewater treatment combination UASB and DHS is go or no go in North Bogor district area hence need done feasibility study to all kinds of aspect is estimated have strong relevation with pertinent plan that is technical aspek, financial, economic social and environment. Result of study indicate that according to technical aspect, ekonomik social and environmental of wastewater treatment combination UASB dan DHS be achieved but from aspect financial improper. Therefore to done the development IPAL proposing of relief fund in the form hibah to JICA.

Key word : domestic wastewater, upflow anaerobik sludge blanket, downflow hanging sponge, feasibility study.

The Selection of Bulking Agents In the Oil Sludge Bioremediation (Case Study : Oil Sludge TOTAL E&P INDONESIA)

Ruti Nurul Hidayati, Syafrudin, Arif B

ABSTRACT

Bioremediation is a technology to process oil waste by using microorganisms to reduce oil concentration (TPH concentration) and eliminate toxicity of contaminant substances. This research conducted to know the conditions of the bioremediation processes through controll variabel observation, knowing efficiency of TPH concentration removal at oil sludge bioremediation, and also to know type of the bulking agents (rice husks, grass, or sawdust) that give the most optimal condition to reduce TPH concentration in order to improve process of oil sludge bioremediation in TOTAL E&P INDONESIA. Substances mixture that used are clean soil, oil sludge, bulking agents, NPK fertilizer, and chicken manure fertilizer. The initial concentration of TPH that used is 5,58%. Bulking agents that used are rice husks, grass, or sawdust. Controll variabel that must be measured are humidity, temperature, pH, and nutrition, whereas. This research limited by the final concentration of TPH 1%. This is according to KepMenLH No128, 2003, that explain the final concentration of TPH is maximal 1%. This research explain the C/N/P ratio that decrease on 23 September than C/N/P ratio on 8 September. Beside that pH range is 5-9 or close to 6-9 that fulfilling criteria of bioremediation conditions that suitable for microorganisms. The temperature for this research are ideal temperature for bacteria growth, are 15-45⁰C. The humidity has a stabil tendency between 12-30%. Each of windrow is explain the same decrease pattern of TPH concentration with final TPH concentration is different. While efficiency of concentration TPH removal with bulking agents rice husks 76,85%, grass 87,05%, or sawdust 79,43%. Open windrow explain the most amount of efficiency TPH concentration with final TPH concentration is windrow B, that using grass for its bulking agents.

Keywords : Bioremediation, Rice husks, Grass, Sawdust, Oil sludge, TPH (Total Petroleum Hydrocarbon) concentration, Temperature, pH, Humidity, Nutrition, Chicken manure fertilizer, NPK fertilizer, open windrow

***Pilot Plant Pengolahan Limbah Cair PT. Phapros, Tbk Semarang
Menggunakan Proses Lumpur Aktif dengan
Variabel SRT (Sludge Retention Time)***

Wiharyanto Oktiawan, ST, MT, Junaidi, ST, Fitri Prabarani

ABSTRACT

Industrial waste water usually contains organic matter in a high quantity. Activated sludge treatment is very suitable to treat it; either the organic matter is soluble or suspended in the waste water. In an effort to make the waste water treatment more economic, efficient and optimal, but still expecting a good effluent, PT. Phapros, Tbk Semarang is planning to change its waste water treatment plant to an activated sludge plant. In finding the most optimal process of the activated sludge activity, PT. Phapros, Tbk Semarang uses the SRT (Sludge Retention Time) as a criterion. By arranging the Q_w , which is the discharged sludge, we can get the data variant of the SRT. In this experiment the variant of the SRT is 5 days, 10 days, and 15 days. The effect of the SRT to the activated sludge removal is illustrative by the removal efficiency of COD and TSS.

The most efficient of the COD and TSS removal is on the 15 day, which is; 53,72% for the COD removal efficiency, and 67,37% for the TSS removal efficiency. Even though the efficiency of the removal of COD and TSS did not achieve the design criterion that is 90%, but this activated sludge treatment did increase the effluent quality compared to the original treatment. The effluent of this treatment has fulfilled the standard quality of the waste water disposal. By using the activated sludge treatment, the residue sludge can be reduced, so the sludge that is sent to the PPLI can be condensed. Besides that, the use of the chemical matter like PAC and magnafloc that is used in the previous treatment plant can be set aside. By the analysis based on this experiment shows by using the activated sludge at PT. Phapros, Tbk Semarang waste water can make the waste water treatment more economic, efficient and more optimal.

Key words : Activated sludge, SRT, COD, TSS

Fitoremediasi Phospat Dengan Pemanfaatan Enceng Gondok (*Eichhornia crassipes*)

(Studi Kasus Pada Limbah Cair Industri Kecil *Laundry*)

Rina Widayanti, Nurandani Hardyanti, Suparni Setyowati Rahayu

Abstract

In this era of technology, people's life style has a tendency to find an easy way in doing house work. One of them is in washing clothes. Small laundry industry has occurred to fulfill the needs of society. But a new problem rises with this solution. Small laundry industries usually dispose their waste water straight to the city drain system with out any treatment before disposal. This causes a large amount of phosphate accumulating in the sewage. Because the environment is unable to handle it by them self, we need a simple, cheap, and applicative way to reduce it before it causes more pollution.

Phytoremediation is one way to help. In this case we try using water hyacinth. Phytoremediation is done by planting the water hyacinth in the waste water. By doing this we expect the plant to absorb the phosphate from the water.

The experiment is for 5 days. With 3 different concentration; 200 mg/l; 250 mg/l; 300mg/l; we obtain different result. For phosphate with an early concentration 200mg/l shows that the plant can reduce it until 24.03 % or about 144, 1603 mg, for the early concentration 250 mg/l shows that the plant can reduce 22,95 % or about 172,1209 mg and for the early concentration 300 mg/l shows that the plants can absorb about 20,87 % or around 187,860 mg. From the statistic test shows that life time in the waste water gives a significant result to the ability in absorbing phosphate by the water hyacinth.

Key word: Phytoremediation; phosphate (P); laundry; water hyacinth.

STUDI KELAYAKAN PEMANFAATAN BIOGAS IPAL TAHU LAMPER TENGAH SEMARANG SEBAGAI SUMBER ENERGI RUMAH TANGGA

ARIE PUJIWATI

ABSTRACT

There are significant efforts of developing alternative sources of energy by many countries in order to reduce dependency of the seldom fossil fuel which is being more expensive. One of many alternative sources of energy is biogas which is generated from anaerobic treatment. Anaerobic treatment not only carrying of environmental advantage, but also economic and social advantages by producing cheap and massal source of energy.

Tofu Industry Wastewater Plant of Lamper Tengah, Semarang, has a facility of anaerobic treatment called Anaerobic Baffled Methane Fermentation Tank (ABMFT) with 130m³/day of treatment capacity and 98% of COD removal efficiency. Theoretically, ABMFT could generate biogas up to 300 m³/day, but measurably it could only produce 106,416 m³/day with 89,09% methane. The demand of biogas as a source of energy for household reaches 200 m³/day. Biogas could be increased by making 7-10 days SRT, so it will yield 300 m³/day methane or 332 m³/day biogas. It is also necessary to maintain better operational and maintenance of ABMFT.

It needs a feasibility study in order to optimize anaerobic process generating biogas and to analyze the feasibility for doing the plant from the aspects of regulation, engineering, environment and finance. The report of feasibility study shows that as the matter of all aspects, this project is feasible to be accomplished.

Keywords: Tofu industry waste water, biogas, optimization of anaerobic process, energy, feasibility study.

**Pemanfaatan Eceng Gondok (*Eichhornia crassipes* (Mart.) Solms.)
dalam Penyisihan Logam Berat Chrom (Cr) pada Limbah Elektroplating**

Isma Prasetyaning Atmasari*, Mochtar Hadiwidodo**, Sri Sumiyati**

Abstract

Effluent that is produce by the electroplating industry, especially nickel chrome plating, contains chrome metal that is carcinogenic. The toxicities from chrome are caused by its ability to dissolve and it's mobility in the environment. An alternative treatment to reduce chrome is called fitoremediasi which uses plants as its indicator; in this case we use water hyacinth.

At the preface experiment, we tried to plant mature water hyacinth in electroplating waste. First we tried to plant in 100% waste water in witch we repeated it 3 times. At the 3rd week; day 18; the plants became yellowish and became wilted. Knowing this fact, we applied the time for our experiment the we were going to executed, with assuming at the 18th day the plants will become wilted as an indicator that the water hyacinth are saturated in adsorbing chrome as the heavy metal pollutant. This became the parameter in designing the time treatment for the plant zone, 4 until 15 days.

The treatment was done by making variation in the amount of plants that are planted, which was 0 plants (as the control), 1 plant, 2 plants, 3 plants, and 4 plants; with 3 times repeating at each stage. The result of this experiment after 18 days shows the chrome concentration and the efficiently in decreasing the concentration on each stage. The highest efficiently for each plant was the treatment by 1 plant only. The highest efficiently in decreasing the concentration was 78,95% ad it was done by the treatment with 4 plants. To get chrom concentration which is fill with the standard, we can add more water hyacinth into the waste with the balance equivalent or we need the lower beginning concentration.

Key word: *water hyacinth, waste, electroplating, chrome.*

**Kajian Sebaran Logam dengan Metode AAN
untuk Menentukan Daya Tampung
Sungai Code Yogyakarta**

Syafrudin^{*)}, Sukirno^{**)}, Yuni Sulistyowati

**PENURUNAN KADAR KROM (Cr) LIMBAH CAIR
INDUSTRI ELEKTROPLATING MENGGUNAKAN ELEKTROMEMBRAN ZEOLIT
(STUDI KASUS CV. MITRA UTAMA, SEMARANG)**

Ahmad Shoiful, Haryono S. Huboyo, Kris Tri Basuki

Abstract

Chromium is one of heavy metal, found in electroplating industrial wastewater. The electroplating industrial results wastewater, its contains high concentration of chromium, about 109,831 mg/l. The purpose of this research is to analize the impact of the independent variabel (time operation, Na_2SO_4 electrolyte concentration, and weight of the zeolite membrane) to the dependent variabel (effluent chromium concentration) and to know the breakthrough time of the electromembrane zeolite. Chromium removed by ion exchange mechanisme by zeolite-H membrane (cation exchanger). The research uses in laboratorium scale with on 20 mA current. The results show that the electromembrane technology can decrease chromium concentration in industial electroplating wastewater, increasing concentration of Na_2SO_4 electrolyte cause increasing chromium exchange to zeolite with current as limiting factor, increasing weight of zeolite cause increasing chromium exchange, and the longer of the time operation cause decreasing ion exchange until the exhausted point.

Key words : electroplating industry wastewater, chromium, electromembrane zeolite, ion exchange

ANALISIS KEMAMPUAN PENJERAPAN TANAH LEMPUNG TERHADAP AMONIUM PADA PENGUNAAN PUPUK DI LAPANGAN GOLF CANDI SEMARANG

Syafrudin^{*}, Suparni Setyowati Rahayu^{**}, Novita A. Siregar^{*}

ABSTRACT

The Candi Semarang Golf Club (CSGC) was cultivated by grass, there are teki, belulang, glagah, sikejut and ilalang. To keep the grown fertility of soil and the grass growth, CSGC treats by using fertilizer. The fertilizer used at CSGC is inorganic fertilizer that is NPK Phonska (15-15-15). The main parameter in this research is the nitrogen content of fertilizer that is ammonium (NH_4^+). This research is needed to find out the adsorption capability of soil to ammonium which is the content of fertilizer. The research is done in laboratory scale by doing in batch and continues column. In continues column was done recirculation into the column to know the pattern of adsorption between the first concentration and the result of its resirculation. The analysis of ammonium concentration s measured by using Spektrophotometer Model 390. The research shows that the soil on the CSGC has a good adsorption capability which is in batch experiment has a removal efficiency of ammonium is about 98,218% and continues column experiment is about 99-100%. Batch experiment get coefficient distribution (Kd) of soil is about 197,03 ml/g and retardation factor (R) is about 8,47, so that is small possibility the contaminated of groundwater by ammonium. In continues column experiment get the optimum adsorption capacity at concentration 40 mg/l and its recircilation 16,83 mg/l

Key Word: adsorption, soil, fertilizer, ammomium

PEMANFAATAN KITOSAN DARI CANGKANG RAJUNGAN (*Portunus pelagicus* Linn.) SEBAGAI ADSORBAN KROMIUM (VI) PADA AIR LIMBAH INDUSTRI PENYAMAKAN KULIT

DEWI MAYA MUNINGGAR

ABSTRACT

Chitosan was reuse of seafood waste from crab shells. Crab shells were proceed into chitosan, one of adsorben that can adsorb heavy metals like chromium (VI) on tannery industrie's wate water. Chitosan was made into three steps; deproteinase, demineralisation, and deasetilation. Initiate waste water's concentration which contacted in adsorben was 100 mg/L and 140 mg/L. Adsorben sieved into G1 (0,4 – 0,95 mm) and G2 (0,96 – 1,5 mm). The aim of project was to get the methods for treatment waste water especially in tannery industry with reuse of crab shells. This project were done experimentally on laboratorium's scale as batch and continue process. On batch process, adsorption could be described using the Langmuir isotherm with maximum adsorption capacity was found to be 41,60 mg/g after 9 hours contact time. Continue process was studied on column's experiment were get 90 – 96% sorption on first 3 hours after 54 hours contact time. Adsorption behaviour depents on many things, especially pH and pH solution was set into pH 5. This was connect with coordination complexation between adsorption sites of chitosan and adsorbat on some pH range.

Keyword : chitosan, crab shells, Kromium (VI), adsorben, adsorption, isotherm

EVALUASI TRANSFER CADMIUM SETELAH ELALUI MEMBRAN ZEOLIT DENGAN DRIVING FORCE BEDA KONSENTRASI DAN BEDA POTENSIAL

DANI PARMAWANTI SUPARMO

Haryono S Huboyo, ST MT dan Dr. Ir. Kris Tri Basuki MSc. APU

Abstract:

Cadmium waste that is found in the publishing waste water is considered as a heavy metal that is hazardous to the environmental. Cadmium in the printing waste water comes from the ink and the metal plates that are used in the printing process. Because the standard of waste water disposal from the Keputusan Gubernur Kepala Daerah Istimewa Yogyakarta no. 281/KPIS/1998 is 0,05 ml/gr, and the water disposal from the publishing that is about 11,19 ml/gr is over the standard. As an alternative in treating the waste water with heavy metal cadmium, solid membrane from zeolite is tried. To establish the correct treatment we have to do a previous experiment on the driving force that is going to be use in the process. In this experiment the driving force that is going to be use is gradient potential and the gradient concentration. The experiment is then continued to find the tendency on factors that gives influence on the gradient potential driving force. The factors are electrolyte and the current that is used. The resolt on the experient shows that gradient concentration is better in trasfering cadmium out of the experiment device.

Key word: Cadmium waste; electromembran; gradient potential driving force; gradient concentration driving force; electrolyte; current;

**PENURUNAN KADAR KROM (Cr) LIMBAH CAIR
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Abstract

Chromium is one of heavy metal, found in electroplating industrial wastewater. The electroplating industrial results wastewater, its contains high concentration of chromium, about 109,831 mg/l. The purpose of this research is to analyze the impact of the independent variabel (time operation, Na_2SO_4 electrolyte concentration, and weight of the zeolite membrane) to the dependent variabel (effluent chromium concentration) and to know the breakthrough time of the electromembrane zeolite. Chromium removed by ion exchange mechanisme by zeolite-H membrane (cation exchanger). The research uses in laboratorium scale with on 20 mA current. The results show that the electromembrane technology can decrease chromium concentration in industial electroplating wastewater, increasing concentration of Na_2SO_4 electrolyte cause increasing chromium exchange to zeolite with current as limiting factor, increasing weight of zeolite cause increasing chromium exchange, and the longer of the time operation cause decreasing ion exchange until the exhausted point.

Key words : electroplating industry wastewater, chromium, electromembrane zeolite, ion exchange

DETAIL ENGINEERING DESAIN SISTEM PENYALURAN AIR BUANGAN DOMESTIK DAN IPAL DI KELURAHAN PEDURUNGAN TENGAH KECAMATAN PEDURUNGAN

*) Dian Juwitasari K **) Ir. Widiarto **) Ir. Dwi Siwi Handayani

ABSTRACT

Sewerage system design of domestic waste water in Pedurungan Tengah village represents wastewater sewerage system to treatment unit through pipe system. Wastewater to be evaluated is domestic wastewater that is water or usage of domestic activity such as bathe, washing, kitchen and water closet.

There is two way to handle of wastewater in Pedurungan Tengah village at this time that is individually and communal. Dismissal system of wastewater not yet been managed better that is thrown to the ground and or to river causing environment contamination, river contamination and others. Alternative that will be use on the planning of domestic wastewater management is shallow sewer system and mini treatmentplant will be use is TSUF (Septic Tank with Upflow Filter). Network system design gravitationally to treatment unit.

Keyword : Sewerage, shallow sewer, domestic wastewater

**PENGARUH DOSIS KOAGULAN PAC
(POLY ALUMINUM CHLORIDE), KAPORIT DAN PENGATURAN PH
TERHADAP PENURUNAN WARNA, ZAT ORGANIK DAN KEKERUHAN
AIR GAMBUT SUNGAI SIAK, PEKANBARU - RIAU**

Oleh Rima Septisia

Abstract

Pekanbaru city, Riau, commonly has raw water characteristics from peat coloured water with high colouring, low pH, and high organics matter that exceed standart of Health Departement No 907/ 2002. For removing high organics matter ang optimizing water quality, it is treated by oxydation with calsium hypochlorite. For decreasing the use of overdoses alum and optimizing the removal of colour and turbidity parameter are used PAC as coagulant. This experiment was done in laboratory scale by using Sungai Siak water in Pekanbaru. The original qualities of peat water are 428 PtCo for colour, 33 NTU for turbidity; 24,88 mg/L KMnO_4 for organics matter and 3,8 in pH. First, peat water is set up 6 – 9 in pH. In each of pH condition, it is added doses calcium hypochlorite in range 35 – 75 mg/L and PAC in range 75 – 175 mg/L. Then, it is in jart test by rotation 100 rpm during 1 minute and rotation 60 rpm during 10 minutes. After settled in ± 10 minutes, it is examined. Maximal quality of water is 0 PtCo for colour, 0 mg/L KMnO_4 for organics matter and 1 NTU for turbidity in addition 65 mg/L calcium hypochlorite, 100 mg/L PAC and in pH 9 with treatment cost Rp 1.717/m³. Maximal quality of water with organics content and economis consideration is 3 PtCo for colour, 0 mg/L KMnO_4 for organics matter and 2,1 NTU for turbidity in addition 45 mg/L calcium hypochlorite, 75 mg/L PAC and in pH 9 with treatment cost Rp 1.262. Water quality of water with only economics consideration is 4 PtCo for colour; 2,24 mg/L KMnO_4 for organics matter and 2,5 NTU for turbidity in addition 35 mg/L calcium hypochlorite, 75 mg/L PAC and in pH 9 with treatment cost Rp 1.172/m³. By organics content and economis consideration to enhance quality of water in order to fulfill health standart and to make consumers satisfied, the use of 45 mg/L calcium hypochlorite and 75 mg/L PAC in pH 9 with treament cost per m³ Rp. 1.262 can be applied in PDAM Tirta Siak. With a compromise in treatment cost and a guarantee in quality from PDAM, the using calsium hypohlorite and PAC can be easy to apply.

Key words : water peat, calcium hypochlorite, PAC (Poly Aluminum Chloride)

**DESAIN SISTEM PENYALURAN DAN PENGOLAHAN
AIR LIMBAH DOMESTIK DENGAN KOMBINASI TEKNOLOGI
UASB (*UPFLOW ANAEROBIC SLUDGE BLANKET*)
DAN DHS (*DOWNFLOW HANGING SPONGE*)
PERUM PERUMAS KECAMATAN BOGOR UTARA, KOTA BOGOR**

Daniel Eko A., Nasrullah, Dwi Siwi Handayani

ABSTRACT

Increase of population and economic growth in a city causing increase number of clean water using and waste water. Increasing number of waste water will affect in those environment if haven't proper handling. Bogor Utara district in Bogor City have high number of population, which domestic waste water is flowt at Ciparigi River and affect river pollution, so that must be right handling.

According Feasibility Study that off site system of waste water treatment by UASB and DHS combination technology is proper to be applied in Perum Perumnas of Bogor Utara district in technic, economic, and environment aspect. So that need to be planned technic design of sewer system and sewage treatment according feasibility study.

Phase of this design sewer system and sewage treatment include, identification, selecting, sewage network and treatment design. Domestic waste water sewer system using small bore sewer system and sewage treatment by UASB (Upflow Anaerobic Sludge Blanket) and DHS (Downflow Hanging Sponge).

Keyword : domestic waste water, small bore sewer system, UASB, DHS

ANALISA KEMAMPUAN ADSORPSI TANAH JENIS LANAU KEPASIRAN (*SANDY SILT*) TERHADAP PHOSPAT SEBAGAI BAHAN AKTIF SODIUM TRIPOLYPHOSPATE INDUSTRI PENGOLAHAN UDANG (STUDI KASUS PT. ISTANA CIPTA SEMBADA, BANYUWANGI)

Dian Vinidya Puspitasari, Nurandani Hardyanti *), Suparni Setyowati Rahayu**)

**STUDI KELAYAKAN PEMANFAATAN LIMBAH AIR PENDINGIN PT INDONESIA POWER SEBAGAI
SUPLAIR AIR BAKU DENGAN METODE DISTILASI**
(Studi kasus: Pelabuhan Tanjung Emas Semarang)

Syafrudin, Mochtar Hadiwidodo, Maharani D.Christanti

ABSTRACT

Tanjung Emas Semarang anchorage has a lot of activities which contains some components. These activities need clean water as first rate activities or supported activities which is supplied by PDAM and deep well. The use of deep well is suspected as one of the causes of land subsidence in Tanjung Emas Anchorage area, while PT Indonesia Power beside PT Pelindo, throwing cooling wastewater in large capacities and it has been worried to be going to pollute the sea because of its temperature. One of alternative solutions to meet the importance of PT Indonesia and PT Pelindo is using cooling wastewater as raw water supply using distillation method, therefore to know it is feasible or not, it's needed feasibility study including technical aspect, financial, legal, environment, and social aspect.

The investment cost of distillation installation is Rp 34.090.597.000,00 (including PPN) and the result of evaluation investment plan is payback period as long as 8,31 years, internal rate of return (IRR) 12,49 %, and benefit cost ratio (BCR) 1,61. The feasibility analysis of financial aspect shows that this installation is feasible to be built because it has payback period < planning period, $IRR > 12\%$, and $BCR > 1$. The built of this installation fills regulations in Indonesia too, considering prejudice impact, management and monitoring environmental. While the social aspect compares between distillation installation and the existing, each installation has its abundance and lack. The result of this study shows that distillation installation is feasible to be built.

Keyword: groundwater, cooling wastewater, feasibility study, Multistage Flash Distillation, land subsidence

REUSE OF SLAG CONTAINING Cr AND Zn FROM INDUSTRIAL STEEL USING SOLIDIFICATION AS CONCRETE MATERIAL TO REDUCE ENVIRONMENTAL POLLUTION RISK

(Case Study PT. Inti General Yaja Steel, Semarang)

Mochtar Hadiwidodo¹⁾, Sri Sumiyati¹⁾, Indah Kurniawaty²⁾

Abstract

The study was conducted to test steel's slag wasted from PT. Inti General Yaja Steel's industry as concrete material using solidification/stabilization (S/S). Physic characteristic of slag is similar with coarse aggregate so in this study slag is used to replace the coarse aggregate; meanwhile chemical characteristic of slag is hazardous waste. Independent variable used is slag that is mixed with coarse aggregate, which is 0%, 20%, 40%, 60%, 80%, and 100%. The concrete was tested using pressurized test and leaching test with submerged simulation. Ions that were tested were total Cr and Zn. Results showed 100% slag variation with volume composition of cement : sand : aggregate = 1 : 1,64 : 3,29 gave the highest compression value (38,44 MPa), tensile strength value 3,40 MPa, and density 2,33 kg/dm³. Leaching test with submerged simulation gave value under threshold limit issued by the IAEA (International Atomic Energy Agency) maximum 10⁻³ gram / cm².day. Cr and Zn leaching rate are 6,094 x 10⁻⁵ gram/cm².day and 2,547 x 10⁻⁵ gram/cm².day. This research concluded that steel slag in PT. Inti General Yaja Steel could be used as friendly environmental coarse aggregate for concrete material. Cost efficiency using solidification up to Rp. 5.000.000,00 (83%).

Keywords: slag, solidification-stabilization (S/S), compression test, leaching test

STUDI POTENSI EKONOMI PEMANFAATAN LIMBAH MINYAK TANAH (*KEROSENE*) INDUSTRI TEKSTIL *PRINTING* SEBAGAI BAHAN BAKAR ALTERNATIF

(Studi Kasus : PT. Sekar Bengawan, Karanganyar)

Sugiarti, Badrus Zaman,ST,MT, M.Arief Budihardjo,ST,MEng.Sc

ABSTRACT

PT. Sekar Bengawan in Karanganyar Regency, Central Java is a printing textile industry which produces 1,25 m³ of kerosene waste per day. Based on technical test, the characteristic of the kerosene waste are as follows, 42,772 MJ/kg of calorific value, 0,08359 mg/m³ of SO₂ emission, and 0,13518 mg/m³ of NO₂ emission. The kerosene waste can be used as fuel with the ratio of time length, volume of soot, and weight of soot is 1,72 ; 1,6 ; and 3,1 times bigger than kerosene. Based on exposure assesment of SO₂ and of NO₂, Hazard index value for adult woman is 0,412 ; adult man is 0,272 ; child 6-12 years is 0,274 ; and child 2-6 years is 0,2725. With Hazard index less than one, so kerosene waste will not generate health impact. Based on these data, kerosene waste can be reused and resold to the market. The target market segments are households and street vendors. Kerosene waste which is priced Rp. 1175/liters will generate Rp. 22.643.437,5 per month of profit compared with Rp.50.625.000 per month of cost if it is treated an hazardous waste treatment.

Key word : Waste kerosene, Hazard Index, Reuse, Economic potency

PENURUNAN KADAR FENOL DAN COD PADA LIMBAH CAIR INDUSTRI CAT DENGAN TEKNOLOGI PLASMA PADA PERMUKAAN AIR

Imam Septana Aryanto*, Anto Tri S. **, Nasrullah*, Junaidi*

ABSTRACT

The electrical discharge technology on the water surface, with the system of non-contact electrode, was used to treat wastewater from paint industry with phenol, pH, TS, and COD parameters. The electrical discharge consists of mix high energy electron and ion and produces active species with high oxidation potential i.e. $\cdot\text{OH}$, $\cdot\text{O}$, and O_3 which are important in organic matter decomposition. The research was conducted with variation in voltage (6,7,8, and 9 kV), the number circulation (1-6 times circulation), and oxygen gas source with constant flow rate 1.5 l/minute. The research showed that the highest rates of reduction of phenol, TS, and COD were achieved in the voltage of 9 kV and in the 6th circulation. The final reduction percentage of phenol, TS, and COD were 89.99%, 27.40, and 63.45%, respectively, whereas pH was lowered from 6.5 to 5. In order to achieve such efficiency, 1.575 kWh of energy input was needed. Based on quantitative analysis, voltage and number of circulation had a significant effect on the reduction of phenol parameters, but they had less significant of pH and TS parameters. Based on qualitative analysis, voltage was related with electrical energy, thus affecting the number of free electron, so that it affects the active species created in the reactor. The number of circulation was related with the contact intensity between organic matters in the wastewater with the active species, therefore the more the number of circulation employed, the more the amount of organic matters can be removed.

Keywords : *electrical discharge, phenol, oxidation, active species*

**PENYISIHAN COD, BOD, TSS, AMMONIA MENGGUNAKAN PROSES BIOFILTER TERCELUP
DENGAN MEDIA BIOBALL SECARA AEROB
(Studi Kasus Limbah Domestik Waduk Setiabudi Jakarta Selatan)**

Kristianti Utomo, Mochtar Hadiwidodo, Sri Sumiyati^{*})

ABSTRACT

Denseness of settlement and bad condition of environment sanitation, and also the outcast of wastewater that is removed to water organ directly without manufacture process have been caused river pollution in Jakarta. The main source of pollution in the Jakarta is domestic's waste water (± 80%), where as an industrial waste water giving contribution just 20%. Something to do to manufacturing the domestic wastewater is with Submerged Biofilter. This research used to manufacturing the domestic wastewater so that can be safe for the environment; know about the influence of hydraulic retention time's variation and recirculation ratio for the efficiency of domestic wastewater manufacture using submerged biofilter with bioball's media in aerob by the parameters of BOD, COD, Ammonia, and Total Suspended Solid (TSS). Sample that it use is domestic waste water from one of inlet in Setiabudi's reservoir at South of Jakarta. From the result of a research, can be find the shortest hydraulic retention time is 6 hours with the COD's efficiency value are 78,42%, BOD value are 79,41%, ammonia value are 61,41%, TSS value are 82,06%. Besides that, the most effective of resirculation ratio is 0,5Q. With resirculation ratio 0,5Q, the waste efficiency of COD are 82,42%, BOD are 83,11%, TSS are 83,38% and ammonia are 78,45%. Effluent result of domestic wastewater manufacture using submerged biofilter with biobal's medial in aerob have been safely if removed to water organ because it is suitable enough with the standard of domestic waste water based on the DKI Jakarta's governor regulation number 122 in years of 2005 about Domestic Wastewater execution in the Provinsi DKI Jakarta.

Keywords : domestic wastewater, hydraulic retention time, COD, TSS, BOD, ammonia, biofilter, bioball, aerob

**PENGOLAHAN LIMBAH CAIR MENGGUNAKAN AOP
(ADVANCED OXIDATION PROCESSES) KOMBINASI OZON-UV
PADA LIMBAH CAIR INDUSTRI MINYAK TERHADAP
VARIASI KONSENTRASI OZON DAN WAKTU DETENSI**

Siti Supriyatin, Haryono Setiyo H, Junaidi

ABSTRACT

Research using AOP (Advanced Oxidation Processes) ozone-UV from oil industry wastewater had been carried out. AOP (Advanced Oxidation Processes) method is an oxidation process using hydroxyl radical capable of oxidizing pollutant in wastewater. This research was conducted to investigate the efficiency of AOP ozone-UV by analyzing the impact of ozone concentration and detention time toward the removal of COD and TS. Ozone concentration yielded from gas source in the form of oxygen entered into ozone generator. The effect of ozone concentration and detention time were investigated. Variation of ozone concentration (1.4 mg/l, 2.0 mg/l, 2.8 mg/l, 3.4 mg/l and 3.5 mg/l) and detention time (5 minutes, 10 minutes, 15 minutes, 20 minutes and 25 minutes). Sampel analysed as much 25. Research showed that the highest efficiency of COD removal, which was 80,37% and TS was 65,52%, was achieved at 3.5 mg/l ozone concentration and 25 minutes detention time. It is concluded that the higher ozone concentration then the higher the COD and TS removal would be achieved. Similiarly, the longer the detention time employed, then the higher the COD and TS removal would be achieved.

Keywords: AOP, ozone-UV, Hidroxyl radical, ozone concentration, detention time, COD, TS

**PENURUNAN LOGAM BERAT Cu MENGGUNAKAN ADSORBEN RUMPUT LAUT JENIS
GRACILARIA VERRUCOSA SECARA BATCH DAN KONTINYU
(Studi Kasus Limbah Industri Elektroplating CV. Kanigoro, Juwana-Pati)
Mahawika Yosaria, Badrus Zaman, Nurandani Hardyanti *)**

Abstract

CV. Kanigoro which is located in Juwana-Pati roles in electroplating industries. Its industrial process produce waste which have copper contaminant is 1,19 mg/l and have pollution potential for environment. Gracilaria verucossa species seaweed is one of used medium for adsorption in waste treatment. This research is to find out the ability of the Gracilaria verucossa to reduce the copper concentration which used batch and continuous process. For the batch process, the Gracilaria verucossa was used with different weight 2, 4 and 6 grams as independent variable. The results showed that the highest removal efficiency obtained for the Gracilaria verucossa with 6 grams was 67-72 %. The continuous process experimental was using column with 5 cm in diameter, 315 ml/mnt and 780 ml/mnt influent as independent variable's. It was found that the removal highest efficiency of copper reached 75-100 % in 315 ml/mnt influent. The value of kinetic constant was 1,6-2,2 ml/mg.sec with operations capacity reached 0,008-0,009 mg/g Gracilaria verucossa.

Keywords: electroplating, adsorption, waste water, copper, Gracilaria verucossa.

PENGARUH WAKTU REAKSI DAN WAKTU TINGGAL STABILISASI PADA SBR AEROB DENGAN PENAMBAHAN KARBON AKTIF TERHADAP PENURUNAN COD

Nur Sita Wijayanti, Mochtar Hadi Widodo, Junaidi *)

ABSTRACT

Sequencing Batch Reactor (SBR) process represent biological wastewater treatment with aerobic process used occasionally to eliminate dissolve organic materials constructively microorganism especially bacterium in course of organic degradation. Sequencing Batch Reactor(SBR) has five phase in its cycle, namely fill, react, settle, draw and iddle phase. In this study iddle phase was changed into stabilization phased where microorganism oxydize organic matter as stored materials in cell under certain aeration period of time. The objectives of this research are to know influence of time react and time stabilisation with added of Granular Active Carbon (GAC) to COD removal. In research was used reactor from plastic material with diameter 25 cm and high is 25 cm, volume of wastewater in reactor is 5 liter and volume of sludge is 35% from volume of wastewater that 1,75 liter. Waste that used was artificial waste glucose soluble with 1032.5 mg/l concentration of COD. As independent variable are react time: (0,5 ; 1; 1,5 ; 2 hours) and stabilitation time (3; 4; 5; 6 hours), if dependent variable are removal of carbon. Application of Granular Active Carbon (GAC) as absorbent, combined with suspended system of SBR, is expected to be able to remove COD better. As the result this research shows that the finest of carbon removal is occurred in time react 1 hours, and time stabilitation 6 hours is 97.23%. COD removal with GAC better than that without GAC.

Keywords: SBR Aerob, removal of carbon, stabilization, activated carbon

ADSORPSI KADAR LOGAM BERAT Pb²⁺ OLEH ABU ENDAPAN BATU BARA

(Studi Kasus: Industri Percetakan CV. Asta Gatra Caesara, Semarang)

Anastasia Pinardisti R.- Syafrudin*- Nurandani*

Abstract

CV. AGC which is located in Semarang, roles in offset industries. Its industrial process produce waste which have plumbum contaminan and have pollution potential for environment. Bottom ash is one of used medium for adsorption in waste water treatment. This research is to find out the ability of bottom ash to reduce the plumbum contaminan in artificial waste which have concentration 20.64 mg/l in the batch and continous process. For the batch process, bottom ash was used free variable with different weight 0, 1, 3, 5, and 7 gram and concentration adsorbat 20.64 mg/l as fixed variable. The results showed that the highest removal efficiency up to 72.09–90.84%. the continous process experimental was using coloum with 2 inchi in diamete, 760 ml/ mnt, and inffluent concentration 15 mg/l, 20mg/l, and 25 mg/l it was found that the removal highest efficiency of plumbum reached 73%-92.93%. the value kinetic constanta was 0.416- 0.490 ml/mg.s with operations capacity reached 0.069-0.081 mg/g.

Keyword: offset, adsorption, waste water, plumbum, bottom ash.

**DETAIL ENGINEERING DESIGN (DED)
INSTALASI PENGOLAHAN AIR LINDI TPA MUARAREJA
KOTA TEGAL**

Kartika Raras H, Mochtar Hadiwidodo, Dwi Siwi Handayani

ABSTRACT

Leachate treatment is an alternative to realize the integrated solid waste management and the environmental concept. Muarareja Final Disposal (TPA) is the only final disposal for people in Tegal City and be located between potential embankment. This TPA still operate open dumping system and doesn't have leachate treatment unit, therefore need to be planed a good leachate treatment unit and to produce effluent to fulfill standart quality appropriate with the Central Java Province Regulation 10/2004 about standart quality of stream water and standart criteria of wastewater quality for industrial activity or for another activity. From the laboratory analysis, parameters which exceed wastewater standart quality is TDS (15800 mg/L), Klorida (25264 mg/L), Phospat (22,06 mg/L), Sulfat (3,866 mg/L), Amonia (76,20 mg/L), BOD (684 mg/L), COD (1597 mg/L) and MBAS (685 mg/L). For design a lechate treatment unit in Muarareja Final Disposal do in some stages, there are :!) Plan leachate pipe from outlet final disposal until inlet leachate treatment unit, 2) Identifiying quality and quantity of leachate, 3) Plan and analyze alternatives leachate treatment unit, 4) Design leachate treatment unit and calculate the cost to build leachate treatment unit. Those design of leachate treatment unit must be treat it so the effluent fulfill that standart quality and expected not to pollute the environment.

Key Word : Leachate, Muarareja Final Disposal in Tegal City, Effluent standart, Leachate treatment unit

Pengaruh Gradien Kecepatan (G) dan *Dissolved Oxygen* (DO) Terhadap Penyisihan COD Dan Amonia Dengan *Simultaneous Nitrification Denitrification* (SND) Pada Sistem Karbon Lumpur Aktif

Mega Nora Budiana, Wiharyanto Oktiawan, Junaidi

ABSTRACT

*Activated Sludge process represent biological wastewater treatment with aerobic process used occasionally to eliminate dissolve organic materials constructively microorganism especially bacterium in course of organic degradation. COD and ammonia efficiency depends on control of DO (*Dissolved Oxygen*) and Mixing Velocity Gradient (G) for formation of flocs . The objectives of this research are to know influence of DO and G to COD and ammonia removal with SND (*Simultaneous Nitrification Denitrification*) with combined between suspended system of activated sludge and Active Carbon (attached). Application of Granular Active Carbon (GAC) as the attach media of microorganism 12.5 % MLSS. . In research was used miny reactor from plastic material with volume 5 L for aeration tank and 2.5 L for sedimentation tank. Volume of sludge in reactor is 5 liter and volume of wastewater is 10 L/day. As independent variable are G ((10-40),(40-70),(70-100),(100-130))/s and DO ((0.5-1),(1-1.5),(1.5-2),(2-2.5)) mg/L , if dependent variable are removal of COD and Ammonia. As the result this research shows that SND can apply with the highest rate of ammonia removal which was 83.85 % was accomplished in G (40-70) /d and (1.5-2) of DO. The highest rate of COD removal which was 99.65 % was accomplished in G (10-40) /d and (2-2.5) of DO.*

Keywords: GAC, activated sludge, COD, ammonia, nitrification, denitrification, SND (*Simultaneous Nitrification Denitrification*)

PENURUNAN KONSENTRASI COD, TSS, TOTAL NITROGEN AIR LIMBAH DOMESTIK DENGAN CONSTRUCTED WETLANDS MENGGUNAKAN TANAMAN KANGKUNG AIR (*Ipomoea aquatica*)

Nia Sagita, Dwi Siwi H, Sri Sumiyati*)

Abstract

Constructed wetlands is an alternative of waste water treatment technology using natural treatment concept. Constructed wetlands is a shallow pond containing some sorts of substrate e.g dirt, gravel and water plant. Constructed wetlands employed activities of microorganism in the soil and plants to treat the waste water. Constructed wetlands system can be used to remove BOD, COD, TSS, Nitrogen, Phosphor, Pathogenes and heavy metals in domestic waste water or in industrial waste water. This research employed free water surface system and Ipomoea aquatica plant. Concentration of domestic waste water and detention time were the variables and the parameters examined were COD, TSS and Total nitrogen. The highest efficiency of COD removal which was achieved in 100 % reactor on the 10th day. The highest efficiency of TSS removal, which was 68,727 %, was achieved in 100 % reactor on the 10th day and the highest efficiency of Total Nitrogen removal, which was 42,728 %, was achieved in 100 % reactor on the 10th day.

Key word : Constructed wetlands, COD, TSS, Total Nitrogen

**POLA PERSEBARAN PENCEMARAN AIR TANAH DI SEKITAR TPA DITINJAU DARI PARAMETER
AMONIAK BEBAS, BESI TOTAL DAN MANGAN TOTAL
STUDI KASUS TPA BANYUURIP KABUPATEN MAGELANG**

Nuruz Zaman, Endro Sutrisno, M Arief Budihardjo ^{*)}

ABSTRACT

Banyuurip Landfill at Magelang Sub-province, Central Java was operated by open dumping system and the wastewater treatment facility does not work properly. This situation tends to cause leachate infiltration and then pollute dig well. From this study it known that free ammonia, total iron and total manganese concentration in leachate are 1,576 mg/l; 5.74 mg/l; and 4.36 mg/l, respectively. In wells sample, free ammonia, total iron and total manganese concentration are between 0.00 – 0.86 mg/l; 0.00 – 0.31 mg/l 0.00 – 0.26 mg/l, respectively. The pollutant dispersion follow the groundwater flow direction to the southwest and northwest the landfill location, Banyuurip and Glagahombo village. It is also known that Groundwater quality in Glagahombo better than Banyuurip groundwater quality because pollutant together with groundwater tend to flow to Banyuurip rater than Glagahombo.

Keywords: Banyuurip Landfill, leachate, groundwater, dig well, free ammonia, total iron, total manganese, pollutant dispersion

**PENGARUH POROSITAS DAN PERMEABILITAS TANAH SERTA JARAK TANGKI SEPTIK
TERHADAP KUALITAS AIR TANAH DANGKAL DI WILAYAH PESISIR DITINJAU DARI
PARAMETER BAKTERI *E. COLI***

Dwi Mardhia; Badrus Zaman ; Irawan Wisnu W*

Abstract

*Ground water exploitation in coastal area which have high ground water level as physically conditions, medium to high permeability and high porosity because of septic tank location not yet fulfilled safety distance to well needs to be considered because bacteria from septic tank could contaminate ground water and causes various disease. The purpose of this research was to know the *E. Coli* bacteria concentration in ground water at district of north Semarang as source of clean water as and to know the relationship between porosity, permeability of soil and distance from septic tank to well with *E. Coli* concentration. Subjects of this research were ground water well that were still being used by community. The sample total were 25 ground water wells and 13 soil sample that were collected based on purposive method. Water sampling was based on sampling method of Indonesian Health Departement (1997), while soil sample was done by soil boring in ± 1 metre depth. Data collecting was performed by using tube fermentation 3-3-3 method. Anova, regression, and correlation analysis were used in this research. The result of this research showed that 25 sample checked were not fulfilled drinking water requirements but 4 sample still fulfilled clean water requirements. Statistical analysis showed that distance variable have a strong relationship with water bacteriological quality with correlation value -83,5%. Porosity and permeability have a weak relationship to water bacteriological quality with correlation value 28,2% and 3,1%. Exponential equation from relationship between well to septic tank distance and *E. Coli* concentration, give recommended well to septic tank distance. The safety distance recommended should be 15 metre to avoid Fecal contamination.*

Key words : porosity, permeability, ground water, *E. Coli* bacteria

**PENGUNAAN ABU SEKAM PADI SEBAGAI ADSORBEN DALAM PENGOLAHAN
AIR LIMBAH YANG MENGANDUNG LOGAM Cu**

Arieyanti Dwi Astuti, Wiharyanto Oktiawan*, Mochtar Hadiwidodo*

ABSTRACT

The industrial development have been increased together with the increasement of the society need. The industrial development will produce another product in the shape of dump that will be throw away to the environment. One of the industrial dump was the industrial dump from the copper industry that contains hard metal copper (Cu). One of the way to manufacture dump is with the adsorption process of the rice plant dust husk. This research has the aim to know the adsorption ability of the rice plant dust husk in decreasing the concentration of Cu metal in the artificial water dump and it was done with batch process and continuous. The batch experiment use 10, 20, 30 gram adsorben for each media size variation 10-30 mesh and 30-50 mesh. Has the highest decreasing efficiency in the weight of 30 gram (30-50 mesh) that is 52,81%-87,80%. In the continuous experiment, it was done in the column with 2 inch diameter and with 222 ml/menit debit. The result was the highest decreasing efficiency until 94,98%-97,10%. Speed constan values (k_1) 0,00743-0,0160 ml/mg.second with adsorp capacity(q_0) 0,7734-1,3376 mg/g.

Keywords: copper industry, adsorption, water dump, copper, rice plant dust husk.

**UJI KEMAMPUAN ZEOLIT DALAM MENYISIHKAN LOGAM Fe PADA LIMBAH CAIR YANG
TERKONTAMINASI MINYAK GORENG BEKAS INDUSTRI KECIL KRUPUK
(Studi Kasus Industri Kecil Krupuk Rambak Dwijoyo, Kendal)**

Yudit Ratania P*), Nurandani Hardyanti*), S.Setyowati Rahayu **)

PENGOLAHAN LIMBAH CAIR INDUSTRI GULA DENGAN TEKNOLOGI PLASMA (*ELECTRICAL DISCHARGE*) SISTEM *NON CONTACT ELECTRODES* DENGAN *OXYGEN ATMOSPHERE* TERHADAP VARIASI TEGANGAN DAN BANYAKNYA SIRKULASI (SKALA LABORATORIUM)

Ulfatul Fuadah ^{*)}, Wiharyanto Oktawan ^{)}, Endro Sutrisno ^{***)}**

ABSTRACT

Plasma technology is one of the technology alternatives to treat waste water. In this research, plasma reactor employs the system of non contact electrodes was used to remove COD in the waste water of sugar industry plant. The plasma technology will produce shockswaves, a very higt temperature, ultraviolet light, O₃, H₂O₂, and some active species wich are very important in oxidation process to decompose organic matter. In this research, voltage and number of sirculation were varied. The higher was set and the more number of circulationwas used, the higer efficiency of COD removal would be achieved. Conductivity and pH of waste water influence to efficiency of treatment. High conductivity of waste water will reduce production of hidroxil radical. Waste water with low pH caused oxidation process was not optimal. The highest efficiency of COD removal, achieved in the voltage of 9 kV and 6 times of circulation, was 65,70%. In order to achieve such efficiency, 0,499 kWh of energy input was needed.

Pengaruh Gradien Kecepatan (G) dan DO (*Dissolved Oxygen*) Terhadap Penyisihan COD Dan Amonia (NH₃) Dengan *Simultaneous Nitrification-Denitrification* (SND) Pada Sistem Lumpur Aktif

Nurmeta Diana Fitri, Dwi Siwi H, Junaidi

ABSTRACT

Activated sludge is biological treatment process to degrade the concentration of suspended, colloidal and dissolved organic matters in the wastewater in aerobical condition. Activated sludge consists of aeration tank, sedimentation tank, and sludge recycle. The objects of this research are to know influence of Gradient Velocity (G) and Dissolved Oxygen (DO) to COD and ammonia removal with Simultaneous Nitrification-Denitrification (SND). SND is a modification of nitrification-denitrification biological treatment which is aerobic and anoxic zone in one process. This research use reactor which consist of aeration tank (volume 5 liter) and clarifier tank (2,5 liter). The wastewater that used is artificial wastewater, which contain glucose solution and the concentration of COD is 1025,82 mg/l. As independent variables are DO (0,5-1), (1-1,5), (1,5-2), (2-2,5) mg/l) dan G (10-40), (40-70), (70-100), (100-130)/ second. The result shows that the highest rate of ammonia removal was 80,51 %, accomplished in G (10-100) /second and (1.5-2) mg/l of DO. The highest rate of COD removal was 98.91 %, accomplished in G (10-40) /second and (2-2.5) mg/l of DO.

Keywords: *activated sludge, COD, ammonia, nitrification, denitrification*

**PILOT PLANT PENGOLAHAN LIMBAH CAIR
PT. COGNIS INDONESIA SECARA BIOLOGIS MENGGUNAKAN SBR UNTUK PENYISIHAN COD dan
NITROGEN (NH₃)**

Putri Nugraheni, Mochtar Hadi Widodo, Junaidi

ABSTRACT

High nitrogen concentration in wastewater treatment can be done by using biological treatment either through oxic and anoxic. One of biological wastewater treatment is by Sequencing Batch Reactor (SBR) as one of a kind activated sludge process. In SBR, carbon removal process, nitrification, and denitrification can be done in one reactor. Carbon removal occurs in the react period, nitrification occurs in aerob phase, and denitrification in anaerobic/anoxic phase.

The aim of this study is to optimizing wastewater treatment process of PT. Cognis Indonesia, especially to decrease high ammonia concentration in its effluent. The independent variables strategy of operational are : oxic-anoxic (3:3); oxic-anoxic, oxic-anoxic (1.30':1.30'); oxic-anoxic, oxic-anoxic; oxic-anoxic (1:1); oxic-anoxic, oxic-anoxic, oxic-anoxic, oxic-anoxic (45':45') and the influence of these strategy to the removal efficiency of COD and nitrogen (NH₃)

The result of this study showed that the most optimum strategy operational in removing COD and ammonia is the strategy oxic-anoxic; oxic-anoxic (1 : 1 hour). In this strategy, the effluent concentration of COD is 640 mg/L with removal efficiency 54.20%, NH₃ is 143.84 mg/L with removal efficiency 46.56%, and for nitrogen is 151.03 mg/L with removal efficiency 44.14%. Comparing with existing wastewater treatment, the nitrogen's effluent value of this study is less, while the COD's effluent is higher than the existing.

Keywords: COD, Nitrogen, operational strategy oxic-anoxic, removal efficiency, Sequencing Batch Reactor (SBR)

**PENGOLAHAN AIR LIMBAH INDUSTRI TEMPE MENGGUNAKAN AHBR (ANAEROBIC
HORIZONTAL BAFFLE REAKTOR) DENGAN VARIASI WAKTU TINGGAL DAN PENGGUNAAN BAK
PENGENDAP
(STUDI KASUS SENTRA INDUSTRI TEMPE KELURAHAN KROBOKAN KECAMATAN SEMARANG
BARAT KOTA SEMARANG)**

Sri Rahmiati R, Mochtar Hadiwidodo, Wiharyanto Oktiawan*)

ABSTRACT

AHBR represent one of alternative technology in waste water treatment biologically process that use anaerob reactor. AHBR is anaerob reactor that has shape of rectangle and bars. and look like septic tank, that reactor has 5 until 6 equal compartment and there is sludge in that reactor. This reactor is exploiting activity mikroorganisme in that sludge for treat wastewater. This reactor is able to removal organic constituents such as BOD, COD And TSS in domestic waste water or industrial waste water. Five bars is used in this research and high of sludge that used is 1 / 3 high of reactor . Time detention is used as Independent variable and COD, BOD, and TSS are used as Dependent variable. The Highest Efficiency (84, 95 %) removal of COD happened at the reactor that using basin control and when td has reach 15 day. The Highest Efficiency (83, 96%,) removal of BOD happened at the reactor that using basin control and when td has reach 15 day. The Highest Efficiency (84, 96 %) removal of TSS happened at the reactor that using basin control and when td has reach 15 day

Key words : Anaerobic Horizontal Baffel Reaktor, BOD, COD, TSS

**ANALISA RESIKO TERHADAP PENDUDUK YANG MENGKONSUMSI AIR SUMUR YANG
TERKONTAMINASI LIMBAH PASAR DAN RUMAH PEMOTONGAN HEWAN (RPH)
(Studi Kasus Kampung Sumur Bong dan Margomulyo Kelurahan Rejomulyo Kecamatan
Semarang Timur)**

Dwi Harwanti; Ika Bagus Priyambada ST, MEng; Sri Sumiyati ST, MSi*)

PENURUNAN KADAR MINYAK BUMI DARI LIMBAH CAIR EMULSI MINYAK DENGAN METODE ELEKTROKOAGULASI (STUDI KASUS DI KILANG PUSDIKLAT MIGAS)

AGUNG WIBAWANTO

ABSTRACT

Emulsified oil in waste water are oil droplets that homogeneously dispersed through the waste water.

The aim of the study was to know decreased of oil concentration in waste water containing emulsified oil by electrocoagulation processing.

The experiment used electrocoagulation apparatus with independent variables electrical current (1 Ampere, 2 Ampere, 3 Ampere) and variation time (0, 5, 10, 20, 25 minutes), and oil concentration as dependent variable.

The results showed that electrocoagulation method can decrease oil concentration of sample I down to 92,71% and sample II down to 94,32%

(Key words: Oil concentration, emulsified oil, waste water, electrocoagulation)

DAMPAK TUMPAHAN MINYAK TERHADAP KONDISI FISIK TANAH (STUDI KASUS KILANG PUSDIKLAT MIGAS)

MARTONO, Ika Bagus Priyambada,ST,Meng, Wiharyanto Oktiawan,ST, MT

ABSTRACT

Tens of thousands of chemical are used in industry, and also in refining of oil and gas processing. Industries in the world especially in Indonesia are faced with increased regulatory pressure to minimize their hazardous waste and to manage them properly. These hazardous waste management and minimization effort require analysis of the source before plans and can be established and implemented and in lifecycle project.

The oil spill incident is seriously problem in oil and gas refining process, caused the serious problem on environment aspect. So the Oil spill incident must be assessed by the risk assessment process to understand the influent of soil and ground water and also on surface water.

The risk assessment process based on four step : Hazard Identification , Exposure assessment, Toxicity assessment and risk characterization. Especially in soil we should to know the important soil properties include the soil texture class, soil mineralogy, bulk density, porosity and organic carbon content.

The oil spill aspect and all of the problems in soil we discussed in this report.

Key Words : Risk of Oil Spill, Soil Characteristics

PEMANFAATAN LUMPUR SEDIMENTASI SEBAGAI KOAGULAN CAIR (Studi Kasus Instalasi Pengolahan Air PUSDIKLAT MIGAS Cepu)

SUHARTO

ABSTRACT

Sedimentation Sludge of water treatment plant in Pusdiklat Migas Cepu has reached $\pm 30 \text{ m}^3/\text{day}$. It's disposed to the Bengawan Solo river and should to be treated or recovered. Study of the use of sedimentation sludge as liquid coagulant has aim to look for the alternative use of sedimentation sludge. It also to get more economical usage of alum (Al_2SO_4).

The Result shows that sedimentation sludge 7,5 mL can remove turbidity from 11,645 to 4,96 NTU and color from 150 to 105 PtCo.

Recovered Sludge is sludge sedimentation added by sulfuric acid. It will recover $\text{Al}(\text{OH})_3$ to $\text{Al}_2(\text{SO}_4)_3$. Jar test method has been used in this experiment. At optimum dosage of variation alum 60 ppm and recovered sludge 40 ppm can remove turbidity from 11,645 NTU to 1,43 NTU (removal 9,215 NTU or 87,72 %) and color removal is 60 Unit PtCo (60 % removal). Based on the regulation of the Health Minister of RI No : 907/MENKES/SK/VII/2002, drinking water has turbidity and color standard at 5 NTU and 15 PtCo.

Sulfuric Acid (H_2SO_4) used to recovered sedimentation sludge has too high cost applied.

Keyword : coagulant alum, sludge sedimentation, recovered sludge, jar test, turbidity, color.

**STUDI KELAYAKAN INSTALASI PENGOLAHAN AIR LIMBAH (IPAL)
PASAR REJOMULYO KECAMATAN SEMARANG TIMUR KOTA SEMARANG**

Mochtar Hadiwidodo, Sri Sumiyati, Amalia Puspitadewi

ABSTRACT

State goverment of Semarang city plans to expand Rejomulyo traditional market. Waste water from Rejomulyo traditional market has suffered some diseases and polluted deepwell's people who live in surrounding market. Based on that reason, waste water treatment plant will be established inside the market on east side, with plan area has 324m². Waste water treatment plant is planned for 20 years and use Submerged Biofilter system. Feasibility study is done in order to know if waste water treatment plant feasible or not to be constructed observed from technical, financial, social-economic, and environmental aspects. In this context, water treatment plant investation cost has Rp1.358.023.000,00 (include tax 10%). First operational costs has Rp 81.000.000,00 with increasing trend has 10% per annum. The result of investment plan evaluate are payback period as long as 10 years and 3 months, net present value as big as Rp 507.303.230,36, internal rate of return (IRR) as big as 22.67% and benefit cost ratio 1,55. Besides, waste water treatment plant has also social-economic benefit and its construction is supported by merchant and people in surrounding Rejomulyo traditional market. The construction of waste water treatment plant has also considered environmental aspect such as the impact estimation and environmental managing and monitoring plan. Result of this study show the estabilishing of waste water treatment plant is allowed to build.

Key words : Waste water treatment plant, environmental pollution, investation, feasibility study.

**EVALUASI DAN DESAIN
INSTALASI PENGOLAH AIR LINDI TPA GUNUNG TUGEL
KABUPATEN BANYUMAS JAWA TENGAH**

Muhammad Fachri, Wiharyanto Oktiawan, Winardi Dwi Nugraha *)

ABSTRACT

Expansion zone of Gunung Tugel landfill (TPA) and effort applying of sanitary landfill from open dumping system is being used this time, surely need goodness management of leachate treatment. At this time Gunung Tugel landfill have two leachate treatments drying at summer and overflow at rain season. Expansion zone of Gunung Tugel landfill project, first installation will be turned into by green zone, while second installation would be evaluated, if that could be redesign or not. Open dumping system at Gunung Tugel landfill cause organic ratio of BOD:COD very small, that is 0.049. This matter cause analysis and evaluation must be done analogy with quality of leachate Jatibarang landfill, Semarang, because equality of topography condition, climate, and existence of latest result test laboratory. Result of evaluation, second installation couldn't be redesign, so that it will be changed as green zone and will be built one leachate treatment at new location which serve entire new zones of landfill. Steps planning of leachate treatment are : 1) analyse leachate quality and evaluation leachate treatment existing, 2) analyse new zones flowrate, 3) determination and election alternative processing of new leachate treatment, 4) calculation of leachate treatment dimension that chosen, 5) calculate cost budget plan to build new leachate treatment plant. Leachate which have passed the plant, treated based on standard quality of Central Java Province Regulation 10/2004. New leachate treatment are : collected pond, anaerobic pond, fakultatif pond, and aerasi pond. Budget plan to build leachate treatment amount 1.448.564.000,00 rupiah.

Keyword : Landfill, Leachate, Open dumping, Redesign, Sanitary landfill.

**PENGARUH TANAMAN ECENG GONDOK (*Eichhomia crassipes*) TERHADAP PENURUNAN
KONSENTRASI BOD DAN COD PADA AIR LIMBAH DOMESTIK INSTALANSI PENGOLAHAN AIR
LIMBAH (IPAL)
PANGGUNG LOR SEMARANG UTARA**

PIETA WOROASTUTI, ENDRO SUTRISNO, NURANDANI HARDYANTI *)

Abstract

*The pollution of domestic waste can have negative effects for health and environment. One of them is river's boita, where the waste will destroy and kill the living things in rivers. So the processing is needed to decrease the pollution of river living, for example by using eceng gondok (water plants with red leaves and edible) as a media to recover then quality of domestic waste water in biological manner. Biologic / bioacumulator as the essence of pollution. The experiment uses a laboratorial analyst method based on the BOD and COD concentration in the domestic waste samples. This process is done by using a batch system with variation the number of water hyacinth (***Eichhomia crassipes***); from no plant (control), 4 plants, 6 plants and 8 plants. Plants variation and detention time were the variables and the parameters examined were BOD and COD. The highest efficiency of BOD removal, which was 46,53%, was achived in 8 plants on the 20th day and the highest efficiency of COD, which was 44,54%, was achived in 8 plants on the 20th day.*

*Key word : domestic waste water, BOD, COD and water hyacinth (***Eichhomia crassipes***)*

**ANALISA PENGARUH PERBEDAAN FUNGSI TATA GUNA LAHAN
TERHADAP BEBAN CEMARAN BOD SUNGAI
(STUDI KASUS: SUNGAI SERAYU – JAWA TENGAH)**

Ratih Puspa Endah Suprpto, Wiharyanto Oktiawan, Ika Bagus Priyambada.

ABSTRACT

Serayu River is a river which the areas of the flown including 5 (five) administrative regencies, start from up stream to down stream are Wonosobo regency, Banjarnegara regency, Purbalingga regency, Banyumas regency, and Cilacap regency. Nowadays, condition of water in Serayu River is experience of degradation of quality and also its amount. One of vitally environmental problem which faced by Serayu River is the increasing contamination of water. Land used is the important thing which has influenced to the quality of the river, whereas BOD is indicator in contamination of territorial water. The sources of wastewater that influenced the condition of Serayu River come from several activities such as wastewater from manure and pesticide of agriculture activity, household (domestic) activity, and industrial disposal have become sources of pollution in Serayu River. Based on the calculation of the wastewater sources of BOD value in category of Non Point Source for domestic and agricultural activities, and also in catagory of Point Source for industrial activity, then it got a conclusion that the activities give an influenced to the BOD loads, and notably the activity that give huge influenced to the BOD loads in Serayu River is from domestic activity.

Keywords : Concentration of BOD, Land Used, Serayu River.

**DESIGN OF WASTE WATER TREATMENT PLANT
UNIT KACANG GARING**

PT. DUA KELINCI

Ricky Arief Budiman¹, Junaidi², Haryono Setyo Huboyo²,

ABSTRACT

As the rising of food industrial competition, PT Dua Kelinci tries to improve the quality and quantity its products in order to fulfill the market demands. The high usage of water through the crunchy bean poaching process and in order to conserve natural resources especially water, are becoming consideration to recycle the wastewaters for a few next poaching processes before it is finally thrown to the river. Wastewater of PT Dua Kelinci is industrial disposal containing organic characteristic TSS 10710 mg/L, BOD 355,2 mg/L and COD 5813 mg/L. TSS, BOD and COD are removed from wastewaters by presedimentation unit, coagulation-flocculation-sedimentation units, filtration unit and also adsorption unit for colors removal, while sludge from the process will be treated on sludge dryings bed. The unit chosen are based on the characteristic of wastewater influent and process efficiency, so it can be expected that the contaminant concentrate will be maximum degraded and still appropriated with quality standard of Perda Jateng No. 10 Tahun 2004. The cost needed for IPAL construction is Rp 1.716.196.900,00.

PILOT PLANT SISTEM LUMPUR AKTIF UNTUK PENYISIHAN NITRAT ($\text{NO}_3\text{-N}$) DAN NITRIT ($\text{NO}_2\text{-N}$) MELALUI *SIMULTANEOUS NITRIFICATION – DENITRIFICATION* (SND) DENGAN VARIABEL DO (*DISSOLVED OXYGEN*)

(Studi Kasus PT. Hartono Istana Teknologi Sayung Demak)

Diah Wahyuningrum*, Wiharyanto Oktawan**, Junaidi**

ABSTRACT

Nitrogen is one of the main nutrients needed in waste water treatment, but if the waste water contains a lot of nitrogen is disposed to the stream may cause eutrophication and other problems. Biological treatment with activated sludge system Simultaneous Nitrification Denitrification (SND) is able to remove nitrogen optimally because nitrification and denitrification occur in the same tank. In an effort to overcome the problem caused by the high nitric and nitrate concentration, PT. Hartono Istana Teknologi Sayung Demak is planning to change its waste water treatment plant to an activated sludge SND plant. Dissolved Oxygen (DO) use as parameters in this observation because SND require DO control to assure that both nitrification and denitrification occurs in the single tank. The variation of DO concentration is done by change the air flowrate (the number of diffusers) entered in the aeration tank. DO variable used is (0.5 – 1.0) mg/l, (1.0 – 1.5) mg/l, (1.5 – 2.0) mg/l, and (2.0 – 2.5) mg/l. The effect of the DO concentration to the activated sludge Simultaneous Nitrification Denitrification (SND) removal is illustrative by the removal efficiency of $\text{NO}_2\text{-N}$ and $\text{NO}_3\text{-N}$. The most efficient of the $\text{NO}_2\text{-N}$ and $\text{NO}_3\text{-N}$ removal is on the (0.5 – 1.0) mg/l, which is; 98.39% for the $\text{NO}_2\text{-N}$ removal efficiency, and 97.47% for the $\text{NO}_3\text{-N}$ removal efficiency. The efficiency of the removal of $\text{NO}_2\text{-N}$ and $\text{NO}_3\text{-N}$ achieve the design criterion, so this activated sludge treatment with SND method did increase the effluent quality compared to the original treatment. The effluent of this treatment has fulfilled the standard quality of the waste water disposal. The conclusion by the analysis based on this experiment shows by using the activated sludge system with SND method is able to finished the problem at PT. Hartono Istana Teknologi Sayung Demak waste water to make the effluent with low $\text{NO}_2\text{-N}$ and $\text{NO}_3\text{-N}$ concentration.

Keywords : *Activated Sludge System with SND method, DO (Dissolved Oxygen), Nitric ($\text{NO}_2\text{-N}$) cocentration, Nitrate ($\text{NO}_3\text{-N}$) concentration*

**PENURUNAN NIKEL (Ni) DAN SENG (Zn) DALAM PENGOLAHAN LIMBAH
CAIR INDUSTRI ELEKTRONIK MENGGUNAKAN METODE PRESIPITASI
DENGAN SENYAWA ALKALI NaOH DAN Na₂CO₃
(STUDI KASUS PT. HARTONO ISTANA TEKNOLOGI)**

Indri Hapsari P*, Wiharyanto Oktiawan**, Junaidi**

ABSTRACT

Nickel (Ni) and zinc (Zn) have negative effect for health human especially if value past add more quality standart. Although concentration low, effect ion heavy metals can influential direct until quantity to eaten chain. Such as resources pollution other enveronmental, heavy metals can removed into reach very far in inveronmental. Chemical treatment with method precipitation hydroxide and carbonate can removal nickel and zinc in a optimum. The promblem effect concentration concentration nickel and zinc that still high and precipitate that result very much from using lime, so PT. Hartono Istana Teknologi Sayung Demak will changes chemical treatment that past order can result effluent with concentration nickel and zinc under quality standart and resulting low precipitate. Precipitation is removal anorganic with addition solute chemicals can be solids formation (flocs and sludge). In wastewater treatment precipitation technologies used for removal heavy metals, sulfate fluorida and phosfat. So that, precipitation method with alkaline complexes NaOH and Na₂CO₃ that will used for removal nikel and zinc Alkaline complexes NaOH and Na₂CO₃ use as precipitans for precipitation. Variable that used is pH for NaOH (9,5 ; 10; 10,5; 11; and 11,5) and Na₂CO₃ (9; 9,5; 10; 10,5; and 11) and also flocculant (anionic polymer 1 mg/l and cationic polymer 5mg/l).

Keywords : Precipitation, Removal Ni and Zn, Polymer

**PILOT PLANT PENGOLAHAN LIMBAH CAIR PT. DUA KELINCI, PATI SECARA
BIOLOGIS
MENGUNAKAN LUMPUR AKTIF DENGAN VARIABEL SRT**

Siti Rahmini, Mochtar Hadi Widodo, Junaidi *)

ABSTRACT

Food Industrial waste is one of source of environmental contamination. Generally to handling this industrial is with biological process, this matter because source of it polutan represent organic substance like carbohydrate, vitamin, protein so that will be able to degradated by biological process. This method most effective than chemical method and the physics. The objective of biological treatment activated sludge is to remove or reduce the concentration of organic compounds with bacteria. In finding the most optimal process of the activated sludge activity, PT. Dua Kelinci, Pati uses the SRT (Sludge Retention Time) as a criterion. By arranging the Q_w , which is the discharged sludge, we can get the data variant of the SRT. In this experiment the variant of the SRT is 5 days, 10 days, 15 days, 20 days, 25 days and 30 days. The effect of the SRT to the activated sludge removal is illustrative by the removal efficiency of COD and TSS.

The most efficient of the COD and TSS removal is on the 15 day, which is; 63,33% for the COD removal efficiency, and 82,59% for the TSS removal efficiency. Even thought the efficiency of the removal of COD and TSS did not achieve the design criterion that is 90%, but this activated sludge treatment did increase the effluent quality. The effluent of this treatment has not yet fulfilled the standard quality of the waste water disposal. This was indicated that to treatment PT. Dua Kelinci waste still need monitoring of characteristic parameter and operate parameter in activated sludge to take care of quality effluen from waste water PT. Dua Kelinci, Pati. By the analysis based on this experiment shows by using the activated sludge at PT. Dua Kelinci, Pati waste water can make the waste water treatment more economic, efficient and more optimal.

Key words : Activated sludge, SRT, COD, TSS

**DESAIN INSTALASI PENGOLAHAN AIR LIMBAH
PT. DUA KELINCI
(UNIT MORNING DAN KACANG ATOM)**

Nur Aini, Junaidi, ST, Ir. Irawan Wisnu Wardhana, MS

ABSTRACT

As rapidly demand for snack, PT. Dua Kelinci try to increase quality and quantity its production to fulfill the market demand. So that increase waste water generation especially waste water that need more treatment if want to dispose to environment without damage impact. Waste water of PT. Dua Kelinci belonging to industrial waste water that has characteristic high organic with TSS 826,25 mg/L, BOD 3994,96 mg/L, COD 7612,68 mg/L, also grease and oil 0,475 μ mg/L. The content of grease and oil is low so that no need grease/oil separator unit, TSS could be removed by coagulation-floculation-sedimentation and filtration. The parameter of BOD, COD could be removed by biological process with Sequencing Batch Reactor (SBR) and adsorption. While sludge production from the treatment result could be handling with Sludge Drying Bed (SDB). Design consideration is based on influen wastewater characteristic so that the effluen is according to the present regulatory requirement in Central Java, Perda Jateng No.10 Year 2004. Investation for this project is Rp 1.774.920.000,00 (a billion and seven hundred seventy four million and nine hundred twenty thousand rupiahs).

Key word : industrial waste water, sequencing batch reactor (sbr).

**PENGARUH KONSENTRASI COD DAN AMONIA (NH₃)
PADA PENGOLAHAN LIMBAH CAIR DENGAN METODE
SIMULTANEOUS NITRIFICATION DENITRIFICATION**

Adi Pribadi, Irawan Wisnu Wardhana ^{*)}, Junaidi ^{*)}

Abstract

Abundant concentration of nitrogen at waste water can cause downhill it dissolve oxygen concentration, racing growth of alga and other plant take root at shallow territorial water, and have the character of toxic to organism. One of nitrogen exclusion is using biological processing through method of Simultaneous Nitrification Denitrification. At this method process of nitrification and denitrification happened concurrently. This research is conducted with the variation of concentration COD equal to 200 mg / L, 400 mg / L, 600 mg / L, 800 mg / L, and 1000 mg / L, and also variation of ammonia used by equal to 100 mg / L, 150 mg / L, 200 mg / L, 250 mg / L, and 300 mg / L. Result of research indicate that the concentration of COD and ammonia influence the nitrogen exclusion, where concentration of COD inversely proportional to concentration ammonia, nitrite, and yielded nitrate. On the contrary concentration COD compare diametrical to nitrogen concentration for the synthesis of free nitrogen and cell yielded. And for the concentration of ammonia compare diametrical to concentration ammonia, nitrite, nitrate, and yielded free nitrogen. But, concentration ammonia not has an effect on direct to nitrogen concentration for the synthesis of cell and concentration of COD which put aside. Result of research also show the variation of concentration COD can be put aside with the efficiency equal to 85 - 95% and variation of ammonia given own the exclusion efficiency equal to 60 - 80%.

Keyword: COD, Ammonia, Simultaneous Nitrification Denitrification

**DESAIN INSTALASI PENGOLAHAN LIMBAH CAIR
SENTRA INDUSTRI TAHU
DUKUH KEMRANGGEN KABUPATEN TEGAL**

Ahmad Mubarak¹, Winardi DN², Haryono SH³

ABSTRACT

Wastewater of tofu industrial center at kemranggen Hamlet which directly thrown to Gung River without beforehand treatment cause greater contamination burden to Gung River, which has been is impured of weight either due domestic waste, and also industrial disposal coming from human being activities in Tegal Regency. therefore an installationis needed to process wastewater of tofu industrial central at Kemranggen Hamlet.

In the step of engineering design of wastewater treatment plant in tofu industrial center at Kemranggen Hamlet, Tegal City include design area identification and also design area choosing, sewer and treatment system analysis, and also wastewater sewer and treatment net design. Wastewater of tahu industrial center, kemranggen Hamlet has an organic characteristic with TSS 2818 mg / L, BOD 543,6 mg / L, and COD 1448,8 mg / L. Effluent concentration of the planned wastewater treatment plant has to accomplish the effluent standart of local government which is Peraturan Daerah Propinsi Jawa Tengah Nomor 10 tahun 2004, for wastewater tofu industry wastewater. These parameters are TSS is less than 100mg/L, BOD and CODare less than 150 mg/L and 275 mg/L. The effluent standard complishment is done by using compiler well, feed basin, ABR, and settling tank

Key words: Tofu Industry, COD, BOD, TSS, effluent standar, ABR

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STRATEGI OPERASIONAL SBR SECARA ANAEROB-AEROB DAN VARIASI SUMBER KARBON PADA PENYISIHAN FOSFOR

Aminah Elly E, Junaidi, Irawan Wisnu Wardhana^{*)}

Abstract

Biological wastewater treatment for phosphor removal could apply Sequencing Batch reactor (SBR). The process occurs in fill-react phase with operational strategy anaerobic-aerobic. To remove phosphor, bacteria need foods which is carbon in wastewater, could be derived from any source such as sugar, starch, etc. This research purpose to know the best of operational strategy anaerobic-aerobic and carbon source in wastewater to remove phosphor. This research used SBR reactor with operation volume was 5 liter. Waste that used was artificial one with 200-300 mg/L of COD concentration. As independent variable are operational strategy anaerobic-aerobic (($\frac{1}{2}$: $3\frac{1}{2}$); (1:3); ($1\frac{1}{2}$: $2\frac{1}{2}$); and (2:2) hour) and variation of carbon source (ethanol, glucose and tapioca), whereas as dependent variable is phosphor removal. The result of this research showed that the best of phosphor removal was occurred in wastewater with tapioca as carbon source and operational strategy anaerobic-aerobic (1:3) hour with efficiency of removal is 76,44%.

Keywords : Sequencing Batch Reactor, operational strategy, carbon source, phosphor removal

STUDI PENURUNAN TOTAL PETROLEUM HYDROCARBON (TPH) PADA OIL SLUDGE DENGAN COMPOSTING BIOREMEDIATION

Catur Hadik Setyowati, Badrus Zaman^{*)}, Syafrudin^{*)}

Abstract

Oil sludge is residu formed by oil contaminant accumutation and precipitation. It contains Petroleum Hydrocarbon (PERTAMINA, 2001) which is toxicious, thus, it needs to be treated to prevent environmental polution. Bioremediation is the application of biological process principles to the treatment of groundwater, soil, and sludges contaminated with hazardous chemicals (Cookson, 1995). Compost is used in bioremediation process because it provides micronitrition for soil and increases soil microorganism composition. The objectives of this research were to find out the concentration of Total Petroleum Hydrocarbon (TPH) after bioremediation by using Tree and Glodogan leaf compost, and to find out the optimal dose of Tree and Glodogan leaf compost-using for oil sludge's TPH degradation. This research resulted the oil sludge's TPH removal in bioremediation process for 8 weeks using 10%, 20%, 30%, 40%, and 50% Tree and Glodogan leaf compost from total bioremediation mixing were 57,53 %, 70,21 %, 93,43 %, 95,76 %, dan 95,55 %. The most effective dose to degrade TPH concentration was 40%. Tree and Glodogan leaf compost from total bioremediation mixing.

Key word: Bioremediation, compost, Oil sludge, Total Petroleum Hydrocarbon.

**PENGARUH KONDISI SISTEM DRAINASE, PERSAMPAHAN DAN
AIR LIMBAH TERHADAP PROGRAM PENYEHATAN LINGKUNGAN
PERMUKIMAN**

(Studi kasus Kelurahan Bandarharjo Kecamatan Semarang Utara)

Defiana Kusuma Wardani^{*)}, Wiharyanto Oktiawan ^{**)}, Maryono ^{**)}

ABSTRACT

The environment quality and society health in Bandarharjo village, North Semarang district is decrease because of the drainage condition, solid waste organize and waste water system. The purpose of this research are knowing condition of drainage system, solid waste and waste water in Bandarharjo village, knowing influential of this condition to environment quality and society health, giving solutions to cope with sanitize settlement environment program which aim to the society development. Method that we use is direct observation, quiz, and interview, measuring BOD concentration, COD, N, and P in the drainage channel and collecting secondary data, which included operational technique and the society participation aspect. The result of the research indicated that concentration of BOD and N in tertiary, secondary, and primary drainage channel is exaggerated than PP NO. 82 in 2001. The counting result indicate that pipe capacity cannot flowing local rain water debit which is accumulating with sewage domestic debit, which will be increased when the sea level rose and flood is happen. The situation will be worse by rubbish, which close the channel up, and causing illness and making sedimentation. The channelling sewage there is not proper to dense settlement also the less of public bathing, washing, and toilet facilities as their sanitation. It causes dirty environment and the society has to give an addition cost for medical treatment and clean water. The solution are raising pipe capacity, dredging the sedimentation, repairing dike and floodgate, 3R programs, and adding trash bin, container and transportation rotation, channelling sewage system centre, repairing public bathing, washing, and toilet facilities, adding cultivation and raising the society participation.

Key words: *drainage system, solid waste, waste water, environment quality, society health, Bandarharjo village.*

PENGARUH WAKTU STABILISASI PADA *SEQUENCING BATCH REACTOR* (SBR) AEROB TERHADAP PENURUNAN COD DAN TSS AIR LIMBAH PT. DUA KELINCI

Dewi Permata Ifadiana, Wiharyanto Oktiawan, Junaidi

Abstract

One of biological wastewater treatment process modification Sequencing Batch Reactor by exploiting period of stabilization time earn to lessen capacities of total aeration volume. Mechanism that happened in this SBR modification same as that happened in Contact Stabilization. There was existence process biosorption, was due to adsorption of the organic matter onto sludge particles, during the contact period (fill - react time). This research aim to know influence of stabilization time to degradation of COD and TSS. This research, used lab scale SBR aerob system units reactor with volume operate for 5 Liters with wastewater from PT. Dua Kelinci. The variation of stabilization time : 5, 6, and 7 hours with 1 hour for react, 1 hour for settle, 15 minutes for draw and 30 minutes for fill. This research used two type of wastewater, wastewater with coagulation – flocculation and wastewater without coagulation - flocculation. The result for this research showed the progressively time of stabilization had influence in removal concentration of COD and TSS. The analyses revealed that happened in degradation of concentration COD and TSS will achieve maximum level at 7 hours stabilization in wastewater with coagulation - flocculation. Efficiency of optimum of COD removal is 78,75 % and TSS removal is 65 %.

Keyword : SBR Aerob, stabilization time, COD, TSS

**PENGARUH STRATEGI OPERASIONAL *SEQUENCING BATCH REACTOR* (SBR) DENGAN METODE *STEP FEED* TERHADAP PENYISIHAN NH_3 , NO_2 , NO_3
(Studi Kasus PT. Hartono Istana Teknologi)**

Hanum A. Prastyanti, Junaidi^{*)}, Wiharyanto Oktiawan^{*)}

ABSTRACT

Sequencing Batch Reactor in biological treatment is a modification of activated sludge process. This metode allows nitrification and denitrification happen sequentially in the same tank. This research is using electronic waste with high nitrogen as 187,34 mg/L nitrate and low carbon as 96,40 mg/L COD which carbon were needed by microorganism as electron source in denitrification process. To solve the problem without external carbon addition, SBR is operated with step feed strategy along with oxic(aerobic) – anoxic pairs conditions. Two, three and four filling events were applied to the research to know the best efficiency of step feed strategy. The SBR was operated on 3 cycles per day with 8 hour per cycle at average 27°-28°. Fill strategy is feed under anoxic conditions. Result shows that, a pair combination of oxic-anoxic (90":90") with two filling events gave efficiency in removal 52,13 % as ammonia, 45,20 % as nitrite and 77, 19 % as nitrate. Three filling events with combinations of oxic-anoxic (60":60") gave an efficiency in removal for ammonia 57,47%, nitrite 49,89 % and nitrate 77,30 %. The best result is four filling events with oxic-anoxic conditions combined sequentially in 45 minute, which gave average removal efficiency of ammonia 66.92 %, nitrite 56.85%, and nitrat 83.62% with best effluen of 27,83 mg/L nitrate and 0,25 mg/L ammonia. This research concluded that more feed give better result and using step feed can improve denitrification process in waste with high nitrate and low COD.

Keywords: COD, Denitrification, SBR, Step feed

**PENGARUH KONSENTRASI *CHEMICAL OXYGEN DEMAND* (COD)
TERHADAP PENYISIHAN NH_3 , NO_2^- , NO_3^- DENGAN METODE
SIMULTANEOUS NITRIFICATION DENITRIFICATION
(Studi Kasus PT. Hartono Istana Teknologi)**

Hesti Susilowati, Junaidi, Irawan Wisnu Wardhana

**EVALUASI DAN DESAIN
INSTALASI PENGOLAH LINDI TPA JERUKLEGI
KOTA CILACAP JAWA TENGAH**

Hesti W, Winardi Dwi Nugraha, Badrus Zaman

ABSTRACT

Expansion zone of Jeruklegi landfill (TPA) and effort applying of sanitary landfill from open dumping system is being used this time, surely need goodness management of leachate treatment. At this time Jeruklegi landfill have a unit leachate treatments drying at summer and overflow at rain season. Expansion zone of Jeruklegi landfill project, leachate installation would be evaluated, if that could be redesign or not. This TPA still operate open dumping system and doesn't have an ideal leachate treatment unit, therefore need to be planed a good leachate treatment unit and to produce effluent to fulfill standart quality appropriate with the Central Java Province Regulation 10/ 2004 about standart quality of stream water and standart criteria of wastewater quality for industrial activity or for another activity. From the laboratory analysis, parameters which exceed wastewater standart quality is TDS (11140 mg/L), TSS (981 mg/L), Fe (31 mg/L), Mn (5,41 mg/L), BOD (4600 mg/L), and COD (7820 mg/L). Steps planning of leachate treatment are : 1) analyse leachate quality and evaluation leachate treatment existing, 2) analyse new zones flowrate, 3) determination and election alternative processing of new leachate treatment, 4) calculation of leachate treatment dimension that chosen, 5) calculate cost budget plan to build new leachate treatment plant. New leachate treatment are : collected pond, anaerobic biofilter pond, aerobic pond, and sedimentation pond. Budget plan to build leachate treatment amount 437.584.000,00 rupiah.

Keyword : Jeruklegi Final Disposal, Leachate, Leachate Treatment Unit, Redesign

Re-design Pengolahan Biologi PT. Sinar Sosro Ungaran-Semarang Menggunakan Sequencing Batch Reactor

Junaidi, ST, Ir. Endro Sutrisno, MS, Kholilah

ABSTRACT

PT. Sinar Sosro Ungaran-Semarang use activated sludge as their biological treatment. In order to get a good treatment it's needed enough oxygen. Oxygen supplied which is famous as aeration that used in this company is blower. The capacity of blower is 30 kW. In this final project will be done recalculate blower capacity in biological treatment using Sequencing Batch Reactor (SBR). It is because beside SBR just need one basin for both aeration and clarifier, it also can be divided to some cycles, fill, react, settle, decant, and idle. Beside that, the aeration system is not continuous. To get comparison of existing treatment and SBR so will be calculated blower capacity in SBR. From this step we can know the energy of aeration. With dimension SBR is a half from existing treatment, the blower capacity and energy of aeration of SBR respectively are 15 kW and 12600 kWh while cost building for redesign is Rp 34.244.477,28.

Keyword: *biological treatment, aeration, blower, sequencing batch reactor*

**Pola Persebaran Satu Dimensi Nitrat dan Phosphat dengan Model Aquatox 2.2 serta Hubungan terhadap Tanaman Enceng Gondok pada Permukaan Danau
(Studi Kasus Danau Rawa Pening, Kabupaten Semarang, Jawa Tengah)**

Murti Ningrum^{*)}, Haryono Setyo H, M. Arief Budihardjo^{**)}

ABSTRACT

Rawa Pening meets with environment degradation like other lakes in Indonesia which is caused by pollutant from the outside especially nitrate and phosphate. Degradation that is happened in this time is water hyacinth blooms (enceng gondok) on the surface of the lake. This makes Rawa Pening's function become annoyed such as PLTA, tourism, fishery, and irrigation. This degradation keeps going and tends to increase so that it is necessary to do nitrate and phosphate monitoring for next time. The taking of sample has done at three points: upstream (S1), middle (S2), and downstream (S3) which are used as an observed data

Method used in this research is predicting nitrate and phosphate concentration for ten years later by Aquatox 2.2. Model validation done with compare observed result and model result. Mean error from this validation less than 5% so that the model supposed describe the field conditions. Simulation model result that obtained for ten years later are nitrate 0,037 mg/L (S1); 0,035 mg/L (S2); 0,032 mg/L (S3) and phosphate 0,296 mg/L (S1); 0,274 mg/L (S2); 0,262 mg/L (S3). Dispersion pattern of simulation model result made by dividing lake into three segment, then search current velocity to get dispersion distance. This pattern showed that nitrate and phosphate concentration progressively decline from S1 to S3. Based on this pattern is knowable enceng gondok amount estimation also progressively decline from S1 to S3. The calculation sum of enceng gondok estimation in upstream is about 66 plants and in downstream is about 43 plants. The width of enceng gondok progressively decline according to the amount of enceng gondok in every contour. But the density of enceng gondok not decline because the differences of every contour area. Support energy of Rawa Pening surface area to enceng gondok is about 180.594,59 m² and support energy of the enceng gondok's total is about 14.054 plants. Total daily loads of Rawa Pening wet longitudinal section is about 6.319.405,41 m².

Keyword: lake, nitrate, phosphate, Aquatox 2.2, dispersion pattern, Rawa Pening

**PILOT PLANT PENGOLAHAN LIMBAH CAIR
MENGUNAKAN SEQUENCING BATCH REACTOR
UNTUK PENYISIHAN NH_3^- , NO_2^- DAN NO_3^-
(STUDI KASUS : PT. HARTONO ISTANA TEKNOLOGI-SAYUNG)**

Yudith Vega P., Junaidi¹, Haryono S.H.¹

ABSTRACT

In an effort to make the waste water treatment more optimal and economic, especially for nitrogen removal, PT. Hartono Istana Teknologi-Sayung is planning to change its waste water treatment plant to the Sequencing Batch Reactor (SBR). SBR is more flexible for removing organic matters and nutrient. In finding the most optimal process of the SBR activity, PT. HIT-Sayung uses the strategy of operational as a criterion. As independent variable are strategy of operational i.e: oxic-anoxic (3 : 3); two pairs of oxic-anoxic (1.30' : 1.30'); three pairs of oxic-anoxic (1 : 1); four pairs of oxic-anoxic (45' : 45'). Variable dependent illustrated by removal efficiency of ammonia, nitrite dan nitrate.

The most optimum strategy of operational is combination three pairs of oxic-anoxic (1 : 1), which are: 0.003 mg/L for the average of effluent NH_3^- with 99.96% for its removal efficiency, 0.28 mg/L for its highest removal efficiency 98.77% and 8.23 mg/L for the average of effluent NO_3^- with 90.15% for its highest removal efficiency. The effluent of this treatment has fulfilled the standard quality of the waste water disposal. Besides that, the operation Coagulation-Flocculation treatment plant that increasing WWTP cost of PT. can be set aside. Therefore, by using the SBR design at PT. HIT-Sayung WWTP can make the waste water treatment more optimal and economic.

Keywords : *SBR (Sequencing Batch Reactor), ammonia, nitrite, nitrat, strategy of operational oxic-anoxic*

**PENILAIAN KUALITAS LINGKUNGAN PERMUKIMAN DITINJAU
DARI SISTEM DRAINASE,
PERSAMPAHAN DAN AIR LIMBAH**

(Studi kasus : Kelurahan Panggung Lor Kecamatan Semarang Utara)

Zakeus Bagus Nugroho, Maryono, ST, MT, Ir. Mochtar Hadiwidodo

ABSTRACT

Kelurahan Panggung Lor in Semarang Utara sub-district is a crowded settlement area with a rapid society growth. As a consequence, the need of proper settlement have to be fulfilled. The proper settlement must be completed with environmental infrastucture for society comfort and healthy. However, at present there is a phenomenon that indicates the environmental infrastructures especially drainage system, solid waste and waste water get less attention from the government and the society itself. Based on this situation, we need to know the existing condition about drainage system, solid waste and waste water management based on the five aspects (institution aspect, technical and operational, financial, law and the role of society), so we could know the value of settlement environment quality as the result of assessment process in study area. In this study, we compare the result of visual observation, society perspective and literature study to make a criteria for assessing the settlement environment quality. We also need to know how far the rate of water pollution in Kelurahan Panggung Lor by analyzing water quality in the drainage. The result of the assessment shows that there are several potentials which could be developed so that the good settlement environment will be reached. On the other side, if there is no effort to keep the environmental infastructures, it will cause poor condition of settlement environment or environmental quality degradation in the study area. The wider impact of this condition is society life quality degradation in this settlement.

Keywords : *assessment, drainage system, solid waste, waste water, Kelurahan Panggung Lor*

EVALUASI DAN OPTIMALISASI INSTALASI PENGOLAHAN AIR LIMBAH DOMESTIK SEMANGGI KOTA SURAKARTA

Hikmat Sandi, Wiharyanto Oktiawan, ST, MT dan Ir. Mochtar Hadiwidodo

ABSTRACT

Domestic waste water treatment plant in Semanggi Surakarta one of the domestic waste water management system according to off site that is operated in the year 2001 with service in this time as much as 6208 house connections. At this time in waste water treatment plant in Semanggi is combination design pre-treatment and aerobic system with capacity 30 l/dt. Processing form that applied according to physics and biology by using several processing units that is grit chamber, equalisasi, aerasi with activated sludge process, sedimentation and sludge drying bed. Effluen from this processing furthermore be channelled to premulung river around 100 m from processing location. During the operational is found several troubleshoots so that want evaluation for the repair. This evaluation is done by using a technical measuring rod that is made based on literature study. Existing condition in this time can be increased with do optimalization and shaped repair or component increasing appropriate evaluation result that done.

Evaluation result based on condition eksisting processing that there in general demo that processing system IPAL Semanggi can be increased with do optimalization shaped repair and component increasing that need. IPAL Semanggi from capacity stills to can to accommodate rate of flow addition from waste water network, from has remainder idle capacity about 2220 SR.

keywords : semanggi, wastewater treatment plant, 30 l/s, idle capacity

**PEMODELAN PERGERAKAN PARTIKEL KONTAMINAN
TIMBAL (Pb) DAN NIKEL (Ni)
STUDI KASUS : TPA NGRONGGO SALATIGA**

**Tiara Farina Hilda¹,
M. Arief Budihardjo, ST, MEng.Sc², dan Thomas Triadi Putranto, ST, M.Eng³**

ABSTRACT

One of environmental problems nowadays is about waste management. Waste destruction in Salatiga City is residing in TPA Ngronggo having location in Dusun Ngronggo, Randuacir Sub-District, Argomulyo District, Salatiga City, broadly 53 ha and starts operates at 1994. Waste management of TPA Ngronggo applies Open Dumping system and is not equipped with Leachate Treatment Installation and drainage system. This thing is potency generates environmental contamination. One of pollution that is related to waste management is groundwater contamination in its surrounding. The purpose of this research are to know the groundwater flow dirrection, to know the distribution pattern and groundwater Pb and Ni particles contaminant transport model, and to know the factors that influencing groundwater Pb and Ni particles contaminant transport model in region around TPA Ngronggo.

Research is done by doing hydrogeological survey includes groundwater level measurement, chemical analysis of groundwater samples, soil test to know soil porosity and hydraulics conductivity value.

From result of modeling simulation of groundwater flow dirrection ,known that groundwater moves from southwest to north-east. Particle contaminant transport follows groundwater flow direction with maximum Pb concentration 042 mg/l and minimum Pb concentration 012 mg/l, while maximum Ni concentration 0. 24 mg/l and minimum Ni concentration 0.098 mg/l. groundwater Pb and Ni particles contaminant transport model influenced by some factors like advection, dispersion, soil characteristic (soil porosity and hydraulics conductivity), residence time and unsaturated zone thickness. From calculation of residence time, assumed that contaminant will contaminate the groundwater in the year 2011.

Keyword : *groundwater particle contaminant transport model, groundwater, Lead, Nikel*

EVALUASI DAN DESAIN INSTALASI PENGOLAHAN LINDI TPA PUTRI CEMPO KOTA SURAKARTA

Tiasti Wening P, Haryono S Huboyo, Nurandani Hardyanti

ABSTRACT

One of the most important problems with designing and maintaining a landfill is managing the leachate that is generated when water passes through the waste. Problems that obtain in leachate treatment installation are drying at dry season and overflow at rain season. Besides, leachate effluent concentrations is higher than standard quality according to Central Java Province regulation 10/2004. the extensive area of landfill and differences topography caused difficulty if only one installation built. Installation that will be evaluated and designed is the installation located on zone 1 Putri Cempo landfill and will be the pilot project for the other zones. According to those conditions, leachate treatment installation will be design with this steps, identifying amount of leachate flowrate, identifying leachate quality and evaluating leachate treatment existing, analyzing and planning alternative processing of new leachate treatment and designing new leachate treatment installation, calculating cost budget plan to build new leachate treatment plant. New leachate treatment are 2 anaerobic ponds, 2 facultative ponds, 2 maturation ponds and wetland. Budget plan to build leachate treatment amount Rp. 325,420,000.00.

Key word : leachate, pilot plan, leachate quality, design, leachate treatment installation

**DETAIL ENGINEERING DESAIN (DED) SISTEM
PENYALURAN AIR BUANGAN DAN INSTALASI PENGOLAHAN
AIR BUANGAN PERUMAHAN SEDERHANA HUNIAN (RSH) TAMAN SENTOSA
DESA NGARGOREJO, KEC. NGEMPLAK, KAB. BOYOLALI**

Arief Nugroho^{*)}; Wiharyanto Oktawan, ST, MT; Haryono S. Huboyo, ST, MT^{)}**

Abstract

RSH Taman Sentosa Residence is an unpretentious residence type which is located at Ngargorejo Village, Boyolali Regency. Due to the condition of the area, which are short-separated to each house, limited land, a flat surface area, and the worried about the water pollution contamination if each of the the house build a septic-tank system, the developer of this residence will build a sewerage system for its domestic waste. The sewerage system applied an off-site system, means that the domestic waste will flow on a closed pipe network. Furthermore, for advanced treatment uses a sump well with pump, initial settled-basin, anaerobic filter basin, aerobic filter basin, and a collector basin. Hopefully, those advanced treatments can solve the environmental problem in the area of RSH Taman Sentosa Residence. On the conclusion with all the system and advanced treatments that applied can make a healthy living residence, comfortable, have a good aesthetic value, and proper to be inhabited.

keyword: RSH Taman Sentosa Residence, off-site system management, the advanced treatment

**PENURUNAN KANDUNGAN PHOSPHAT PADA LIMBAH CAIR
INDUSTRI PENCUCIAN PAKAIAN (LAUNDRY)
MENGUNAKAN KARBON AKTIF DARI SAMPAH PLASTIK
DENGAN METODE BATCH DAN KONTINYU**

(Studi Kasus : Limbah Cair Industri Laundry Lumintu Tembalang, Semarang)

Dessy Ika Rahmawati¹, Dwi Siwi Handayani², Irawan Wisnu Wardhana³

ABSTRACT

The increasing of laundry industry influenced to the increasing of detergent utilizing. The dominant substance which contained in the detergent was Natrium Tripolyphosphat which had function as a builder and surfactant. So the waste contained Phosphate. Most of the laundry industry threw their waste without treatment first. These would cause Eutrofication where the water body became rich of dissolved nutrient, descending of the dissolved oxygen and capability of water body assist power to water biota. Lumintu was one of the laundry industries which located in Tembalang district. According to the result of pre-experiment, water waste industry contained 10,21 mg/l phosphate. This value exceeded standard quality of Perda Prov. Jateng no. 10 year 2004 about maximum value for total of phosphate was 2 mg/l. One of wastewater treatment method was adsorption using the active carbon from plastic rubbish kind of Polyethylene. This experiment had a purpose to know about capability of active carbon from plastic rubbish in reducing phosphate content with batch and column operation. Batch operation used 1,2 and 3 gram variation weight active carbon from plastic rubbish for 30 - 60 mesh and 100 - 200 mesh variation media size. Batch operation had 45,45 % from the highest phosphate efficiency lowering on the 3 gram. Otherwise, coloumn operation did on the 1 inch diameter column with 50 ml/minute and 100 ml/minute debit variation. Continue trial had 54,75 % from the highest phosphate efficiency lowering on the 50 ml/minute. Constanta value speed (k_1) is 0,0108 ml/mg.s with capacity of adsorption (q_o) 0,677 mg/g.

Keyword : wastewater of laundry industry, phosphate, adsorption,
active carbon from plastic rubbish

PENGUNAAN TEKNOLOGI PLASMA CORONA DISCHARGE UNTUK MENURUNKAN KADAR WARNA, COD DAN TSS PADA LIMBAH CAIR INDUSTRI MINUMAN RINGAN

Diani Anggita Sari *), Haryono Setyo Huboyo, Mochtar Hadiwidodo **)

ABSTRACT

The soft drink production process resulting waste water contains high color, COD and TSS quality. General treatment for soft drink waste water usually using conventional method but this method became inefficient since highly cost on operational. Recent alternative method for waste water treatment is using plasma technology to decreasing the high quality of color, COD and TSS. Plasma formed in a reactor that comprises two electrodes which one connected with high voltage. The reactor resulting active species with high oxidation potential i.e. $\bullet\text{OH}$, $\bullet\text{O}$, $\bullet\text{H}$, O_3 and H_2O_2 , and it have important role to removing organic compounds. This study is to discover the affectivity of plasma technology to degrade the quality of color, COD an TSS in soft drink waste water. Soft drink waste water treated in a rector with high voltage (16, 17, 18 kV) and circulation variation (1-6 times). The voltage and circulation variation influences the degradation of color, COD and TSS in waste water. The degradation of color, COD an TSS increases with higher voltage and more amount of circulation. The highest degradation of color, COD and TSS was attained in 18 kV with 6 circulations. The degradation percentages are 99,91 %, 98,72 % dan 98,66 whereas waste water pH before treatment reached 8 and in the end of treatment positioned around 7. The energy requirement to obtain this efficiency is 0, 0968 kWh with electrical cost is Rp. 1.473/m³.

Key Word: corona discharge plasma, oxidation, active species, voltage, circulation.

**PENURUNAN KADAR KROMIUM TOTAL HASIL REDUKSI KROMIUM (VI) LIMBAH CAIR
INDUSTRI PELAPISAN LOGAM KROM MENGGUNAKAN ADSORBAN ARANG AKTIF DARI
SABUT KELAPA (*Cocos nucifera*)
(Studi Kasus : Limbah Cair Industri Elektroplating CV Citra Utama Semarang)**

Ika Rahmadani *), Suparni Setyowati Rahayu, Mochtar Hadiwidodo)**

ABSTRACT

CV Citra Utama which is located in Semarang roles in electroplating industries. It's industrial process produce wastewater which have hexavalent chromium contaminant is 9,117 mg/l and have pollution potential for environment. In the overcome, the hexavalent chromium is reduced into trivalent chromium. In the reduction of hexavalent chromium using ferrosulfat at pH 2 produce 4,00 mg/l total chromium. That concentration is higher than effluent standart in Perda Prop. Jateng No 10 tahun 2004 about effluent standar of wastewater of electroplating industries in which the maximum concentration of total chromium is 0,5 mg/l. Activated charcoal from coconut fiber is one of used medium for adsorption process in wastewater treatment. This research has the aim to know the adsorption ability of the activated charcoal from coconut fiber to reduce the total chromium result from reduction hexavalent chromium in artificial wastewater and it was done with batch and continous experiment. The batch experiment use 1, 2, 3 gram adsorben for each media size variation 30-60mesh and 100-200mesh. It has the highest removal efficiency of total chromium in the weight of 3 gram (100-200mesh) that was 51,75-52,00%. In the continous experiment, it was done in coloumn with 1 inch in diameter, 50 ml.menit and 100 ml/menit influent as variation. It has the highest removal efficiency of total chromium in 50 l/menit influent that was 62-66%. The value of kinetics constanta was 0,00748-0,00917 ml/mg.sec with adsorp capasity (q_o) 0,847-1,368 mg/g.

Keywords : wastewater of electroplating industries, total chromium, adsorption, activated charcoal from coconut fiber.

**PENURUNAN WARNA, COD DAN TSS LIMBAH CAIR INDUSTRI TEKSTIL
MENGUNAKAN TEKNOLOGI *DIELECTRIC BARRIER DISCHARGE* DENGAN VARIASI
TEGANGAN DAN FLOW RATE OKSIGEN**

Indrasarimmawati *), Mochtar Hadiwidodo, Haryono Setyo Huboyo)**

ABSTRACT

Textile wastewater consist of colour matter, Chemical Oxygen Demand (COD) and Total Suspended Solid (TSS) in high dosis so that it have potency to pollute environment. Generally, textile wastewater can be treatment by konventional method. But, this method was not efficient because operational cost which is expensive. Discharge technology is new method to textile wastewater treatment. Dielectric Barrier Discharge reactor is discharge reactor to decompose organic matter in wastewater. Discharge was formed in reaktor which was given high voltage current to result active spesies with high oxidation potential, such us $\cdot OH$, $\cdot O$, $\cdot H$, O_3 dan H_2O_2 which are important to organic matter decomposition. This research intends to know capability of discharge which was formed in Dielectric Barrier Discharge reactor to decrease colour matter, COD, and TSS. Textile wastewater was treatment ini the Dielectric Barrier Discharge reactor with variation in voltage (16,17,18 kV) and Oxygen flow rate (0,5;1,5;2,5 l/m). Voltage and oxygen flow rate variation affective to decomposition efficiency of colour, COD and TSS. Decomposition of each pollutant will be higher with voltage increasing and flowrate decreasing. Colour, COD and TSS decreasing was highest when was given maximum Voltage (18 kV) and minimum Oxygen flow rate (0,5 l/m). Percentages of colour, COD and TSS are 47,78%, 76,50% and 70,72%. Even pH in final treatment are between 6-7. Energy input which was needed to maximal treatment is 0,1128 kWh with electrical cost Rp.8,134/l.

Kata kunci : *textile wastewater, Dielectric Barrier Discharge, oxidation, active species.*

**STUDI PENDAHULUAN LUMPUR SIDOARJO
SEBAGAI ADSORBEN LIMBAH ZAT WARNA TEKSTIL
(REAKTIF : PROCION RED MX-5B)**

Indrastuti ¹⁾, Ir. Mochtar Hadiwidodo ²⁾, Sri Sumiyati ST. Msi ³⁾

ABSTRACT

The growth of Indonesian textile industry has positive effect for economy, but it also has negative effect for environment by producing waste. Primary characteristic of textile industry is high content of sintetic dyes. Textile dyes are non-biodegradable organic compounds that can potentially make environmental pollution. One of the methods that can be applied for reducing dyes is adsorption. Sidoarjo mud has kaolinit-montmorilonit mineral compound. This mineral can be used for adsorbent, because of the electricity contents and ability to tie up metal ions and organic compounds. This research had been done adsorption experiment of textile dyes (reactif : Procion Red MX-5B) using Sidoarjo mud adsorbent. Adsorption experiment had been done by batch reactor with different methods of mud activation. From experiment result, acid activation method has the biggest adsorption efficiency compared to alkali and hotting (neutral) activation method. Acid adsorbent has adsorption efficiency until 96,5 %. While alkali adsorbent can only reach the efficiency of 12,5 % and 57,5 % for neutral adsorbent. Adsorption model for acid and neutral adsorbent follow BET isotherm, while alkali adsorbent is follows Langmuir isotherm.

Key word : *Adsorption, Sidoarjo mud, textile dyes*

EVALUASI DAN OPTIMALISASI INSTALASI PENGOLAHAN LUMPUR TINJA (IPLT) KABUPATEN KARANGANYAR

Wiharyanto O^o); Winardi, DN^o); Jumiasih

ABSTRACT

Karanganyar Septage Treatment Facility is a septage manufacture which serves Karanganyar City district. At this moment, the facility is disfunction because the worse of IPLT management system and IPLT does not work optimize. The discharged capacity reaches 10 m³ /day but only 1,28 m³/day septage enter in septage treatment facility. Beside that, in facultative and maturation ponds have been overdesain and caused process does not work. In order to increase IPLT effectiveness, evaluation and optimization need to be done which is concerning 5 IPLT management aspect. The mentioned five aspects are includes institution, financial, legal, operational and technical, and also social aspect. With evaluation concerning to those aspects it is expected that the optimization IPLT management system and process will be occurred. The evaluation result shows that IPLT of Karanganyar needs to expand service area, make regulation about IPLT management and WC suction duty, repair treatment units and repair IPLT mangement and operational infrastructure.

Key Word : Septage Treatment Facility, septage, management system, optimalization

STUDI PENGARUH OPERASIONAL KOMBINASI FEEDING BIOSTARTER DAN FEEDING AIR DALAM REAKTOR (PILOT PLANT) ANAEROBIK DIGESTER SKALA KECIL

*Muhamad Alfi Ulumillah, M. Arief Budihardjo, Haryono S. Huboyo *)*

ABSTRACT

The research was conducted as the starting point on knowing how big the addition biostarter influence and water to potency biogas which is produced from organic waste degradation process of market and restaurant by anaerobic process. In this research is biostarter fuction as catalyst to quicken organic waste degradation process. While water addition function as moisturizer substrat factor in digester. Contribution of addition biostarter combination and water in this research, able to yield a lot of biogas with contains methane gas which is high enough. This research represent laboratory scale experiment using batch system with fifth variations of treatment observed. The variations aim to determine a most effective variation with criteria is a variation which capable to yield a lot of biogas volume and methane gas and the high efficiency of quality slurry reduction on a brief HRT (Hydrolic Retention Time). The result of research indicates that methane gas percentage in biogas at every variant range from 21.89 - 30.78 % acid substrat level 5.47 - 7.41, which still at a good range for bacteria for live and the efficiency of quality slurry reduction at every variant especially at his organic content range from 15.29 - 93.92 %. Bacteria performance in anaerob process have shown result which optimal enough.

Keywords : organic waste; biogas and methane gas; anaerobic digester; biostarter and water

**TEKNOLOGI PENGOLAHAN LIMBAH CAIR INDUSTRI KECIL TAHU
MENGUNAKAN PROSES AN-AEROB DENGAN STARTER EM4 DALAM UPAYA
MENDAPATKAN ENERGI YANG RAMAH LINGKUNGAN DENGAN VARIABEL
*Hidrolic Retention Time (HRT)***

(Studi Kasus : Limbah Cair Klaster Tahu Adiwerna Kabupaten Tegal)

NANIK YULIANTI

ABSTRACT

Adiwerna Soybean's Cluster in Tegal, gets much attention from environmental aspect because of high organic material and untreatment waste that cause in pollution. Waste water treatment technology which is develop there is using an-aerobic process by adding EM4 starter to produce biogas as green alternative technology. This research purpose in finding HRT for optimal anaerob process in soybean waste water treatment in Adiwerna Soybean's Cluster, Tegal using parameter COD decrease efficiency and biogas production. In the first research, adding of EM4 starter in 500 mL waster water is done with 5 EM4 variety comparison (0 mL, 0,25 mL, 0,5 mL, 0,75 mL, 1 mL) and 5 HRT variety (0 hari, 6 hari, 8 hari, 10 hari, 12 hari). The most optimal comparison in COD decrease will use to the next biogas production research. The most optimal comparison in COD decrease is the 5th comparison variety (500 mL waste : 1 mL EM4) with efisiency 82, 56 % at 12 day HRT. At the 5th camparison variety, COD decrease is calculated until 22 days HRT to find COD decrease and biogas production trend. Base on data analisys, the most optimal HRT in COD decrease dan biogas production is 10 hari with efisiency 78 % and TSS decrease is about 64 %. Biogas product include of 71,23% CH₄, 21,12 % CO₂, with heating value is 4199,47 kal/gr. Anaerob process effluent is higher than standart Perda Jateng no 10 tahun 2004. But this treatment can increase waste water quality. Volume of digester, fixed dome type with diameter 3,8 meters, high 1,9 meters with kerucut high 1,09 meters and diameter 3,8 meters is the most optimal design base on the research. From the data analisys result, conclude that optimal EM4 concentration is 0,2% (500 mL water : 1 ml EM4) and optimal HRT is 10 days, and biogas characteristic is included of 71,23% CH₄, 21,12 % CO₂, with heating value is 4199,47 kal/gr.

Key words : EM4 consentration, Hidrolic Retention Time (HRT), COD decrease, and Biogas volume.

**PEMANFAATAN LIMBAH FLY ASH SEBAGAI BAHAN CAMPURAN PAVING
BLOCK UNTUK MENGURANGI TINGKAT PENCEMARAN LINGKUNGAN
DARI LOGAM BERAT Pb
(Studi Kasus PT. Pabrik Kertas Tjiwi Kimia,Tbk)**

Niken Sri Hartiwi¹⁾, Mochtar Hadiwidodo²⁾, Badrus Zaman²⁾

ABSTRACT

This research has been held to know the ability of Fly Ash waste from PT. Pabrik Kertas Tjiwi Kimia, Tbk, as a block pavement material using solidification/stabilization (S/S) methode because of chemical characteristic shows that Fly Ash contains lead which is hazardous waste. Beside containing lead, Fly Ash also contain oxide silica that can make chemical reaction with calsium hidroxide that come from hydration cement process and yielded a cementation, so in this case Fly Ash is used to replace a few part of cement in the mixture. Independent variable for this study is variation of Fly Ash persentation as a substitution material for a few cement which are 0%, 5%, 10%, 15%, 20%, and 25% from the total cement of the mixture. Block pavement was tested using pressurized test, water absorption test, and leaching test with submerged simulation which use lead as the parameter ion. Research showed that block pavement with 5% Fly Ash with composition of cement : Fly Ash : sand = 0,7125 : 0,0375 : 2,25 have the optimal compression value 86,8750 kg/cm², the optimal water absorption 3,036%, and a cheaper cost with lead leaching test after solidification process still fulfilling limit issued by the IAEA = 10⁻³ gram/cm².day. Research also showed that block pavement with 15-25% Fly Ash have a lead leaching test over the limit issued and that's not recommended to use. This research concluded that Fly Ash from PT. Pabrik Kertas Tjiwi Kimia, Tbk, can be used as a block pavement material with variation of Fly Ash 5-10% meanwhile the composition of cement : sand = 1 : 3.

Keywords : block pavement, Fly Ash, leaching test, pressurized test, solidification

**IDENTIFIKASI KELAS AIR DENGAN METODE STORET DAN PENENTUAN DAYA
TAMPUNG BEBAN CEMARAN BOD SUNGAI
DENGAN SOFTWARE QUAL2E
(STUDI KASUS SUNGAI SERAYU, JAWA TENGAH)**

Ratih Kusuma Wardani, Winardi Dwi Nugraha, Haryono Setiyo Huboyo

ABSTRACT

Serayu River is one of the river in Central Java which located at 5 Regencies such as Wonosobo regency, Banjarnegara regency, Purbalingga regency, Banyumas regency, Cilacap regency. The length of Serayu river area is 181 km. Environment issue faced by Serayu River is the increasing of the BOD loads that represent the territorial indicator of water contamination. Based on the result of the class identify with the storet method got that at the segments 16 had a good water quality that belong to the I,II,III and IV water classes. While at segment 2,4,5,6,7,9,11,13,15 had an average value to the I water class and had a good water quality to the II,III,IV water classes. While at segment 1,10,12 had an average value water quality to the I,II,III classes and had a good water quality to the IV water classes. While at segment 3,8,14 had an average value water quality to the I,II classes and had a good water quality to the III, IV water classes. Based on the result simulation of BOD with QUAL2E at minimum debit which compared to permanent quality of BOD PP Number 82 Year 2001 got that Serayu River can fulfill permanent quality of class 4. And Serayu River can fulfill permanent quality of class 1,2,3, and 4 at maximum debit simulation of BOD.

Key Word : BOD, Qual2E, Serayu River

PEMANFAATAN HYDRILLA (*Hydrilla verticillata*) UNTUK MENURUNKAN LOGAM TEMBAGA (Cu) DALAM LIMBAH ELEKTROPLATING

Studi Kasus : Industri Kerajinan Perak Kelurahan Citran, Kotagede

Widya Hartanto¹, Sri Sumiyati², Dwi Siwi Handayani³

ABSTRACT

*Silver handicraft industries released waste water which contained copper (Cu) with concentration of 4,628mg/l. Such concentration had exceeded the standard quality of KepMenLH No 51 Year 1995. Waste water treatment to reduce Cu concentration was conducted by using hydrilla (*Hydrilla verticillata*). This experiment had a purpose to find out the efficiency of hydrilla weight and the optimum retention time to reduce Cu concentration. Experiment was conducted in batch system with 150 gr, 200 gr, and 250 gr hydrilla weight variances and 30 days retention time. Experiment design used was Completely Random Design (CRD) repeated twice. Waste water sample was 5 L for each topless with the total of 7 topless. Cu concentration analysis was performed on laboratory by examining some parts of the hydrilla sample once in 3 days, and the waste water was examined for the Cu concentration on the 30th day. The operation result showed the average of Cu concentration reduction at the control topless without any treatment was 3,782 mg/l, the average of the 250 gr hydrilla weight treatment was 0,862 mg/l. The averages of Cu reduction efficiency for each weight were : 150 gr = 54,49%; 200 gr = 70,43%; 250 gr = 81,37%. The optimum retention time is at the 15th day with 0,027 mg/l of Cu concentration reduction. These results showed that the most efficient treatment was the hydrilla with the weight variance of 250 gr with 15 days retention time*

Keywords : copper (Cu, electroplating, hydrilla

**PENGARUH TANAMAN KAYU APU (*PISTIA STRATIOTES L*) TERHADAP PENURUNAN
KONSENTRASI BOD PADA AIR LIMBAH TAHU
(INSTALASI PENGOLAHAN AIR LIMBAH (IPAL) TAHU
LAMPER TENGAH, SEMARANG)**

Winardi Dwi Nugraha, Endro Sutrisno*), Andita E. S

**EVALUASI DAN RENCANA PENGEMBANGAN
SISTEM PENYALURAN AIR BUANGAN
KOTA SURAKARTA**

Andri Prihatanto*, Dwi Siwi Handayani **, Haryono Setiyo Huboyo **

ABSTRACT

Surakarta is one of big city that located in Central Java Province. The population growth rate of Surakarta is 0,6 % per year with population equal to 564.726 on 2007. At this moment, Surakarta has already had the off-site sewerage system plan, with percentage of service approximately 10,64 % or 10.896 in house – connecting. In line with the population growth and the city activity, it is needed an optimalization and development in sewerage system plan. This requirement of sewerage system plan optimalization is based on the evaluation and analysis of the interceptor pipe capacity. The service development is planned until the end of 2020, consist of pipe network areal enhancement and addition of house – connecting service.

Keyword : *sewerage system, existing evaluation, development design.*

**ANALISIS PERGERAKAN LINDI SEBAGAI PENCEMAR AIRTANAH SEKITAR TPA
DITINJAU DARI PARAMETER KLORIDA DENGAN MODEL OPTIMAL WELL
LOCATOR 1.2 (STUDI KASUS TPA JATIBARANG, SEMARANG BARAT)**

ANISA KHORIDA MULANTIKA

Badrus Zaman, ST, MT dan M. Arief Budihardjo, ST, Meng. Sc

ABSTRACT

TPA Jatibarang Semarang in West Semarang. Spread of municipal waste can be controlled because most of the municipal waste generated will ultimately be collected at this landfill. The longer the water leachate generated from the degradation of waste to be difficult to control. This can cause potential environmental pollution. The ability of leachate to seep into the ground and moving along with the flow of groundwater is influenced by several factors, including hydrological and hydrogeological cycle. Then there was the reaction between the leachate with groundwater that mixed and can contaminate groundwater. Research conducted at the landfill this Jatibarang intended to give a pattern of movement of contaminants in the groundwater around the landfill. Well water quality parameters viewed from chloride. Sampling wells conducted in seven people in Sub-District Bambankerep points and five points in Sub-District Kedungpane, each point and the concentration of chloride that has been laboratory tested, ie SM 110 = 62,650 mg / L, SM 111 = 63,575 mg / L, SM 112 = 70,303 mg / L, SM 113 = 68,550 mg / L, SM 114 = 53,720 mg / L, SM 115 = 61,115 mg / L, SM 116 = 52,730 mg / L and SM 117 points = 59,335 mg / L, SM 118 = 60,725 mg / L, SM 119 = 53,550 mg / L, SM 120 = 64,890 mg / L, SM 121 = 51,626 mg / L. Then the data were analyzed using OWL model (Optimal Well Locator) 1.2 and the direction of motion result of leachate from a single source of pollutants in the landfill to the southeast toward the landfill. This shows that people who have wells in the north of the landfill does not have pollution because the content of Cl⁻ is still below standard quality.

Keyword : groundwater, chloride, leachate, OWL 1.2 , contamination, moving, wells, TPA Jatibarang,

PEMANFAATAN LUMPUR SIDOARJO SEBAGAI ADSORBEN ZAT WARNA TEKSTIL JENIS REAKTIF DAN ION – ION LOGAM (Cr^{6+} DAN Cd^{2+})

Badrus Zaman, Sri Sumiyati^{*)}, Ariya Mufti

ABSTRACT

The growth of Indonesian textile industry has positive effect for economy, but it also has negative effect for environment by producing waste. Primary characteristic of textile industry is high content of sintetic dyes. Textile dyes are non-biodegradable organic compounds that can potentially make environmental pollution. One of the methods that can be applied for reducing dyes is adsorption. Sidoarjo mud has Illite, Nacrite, Chlorite – serpentine, Albite low dan Quartz mineral compound. This mineral can be used for adsorbent, because of the electricity contents and ability to tie up metal ions and organic compounds. This research had been done adsorption experiment of textile reaktif dyes, metal ion of Cr^{6+} and metal ion of Cd^{2+} (Case study : textile industry PT.APAC INTI CORPORA) using Sidoarjo mud adsorbent. Adsorption experiment had been done by batch reactor with different mass of mud. From experiment result that the biggest mass has the biggest adsorption efficiency. Adsorption experiment had been done by continue reactor with CMFR method with 50 gr mass of mud. Adsorption efficiency for batch method for textile reaktif dyes reach of 98,07%; metal ion of Cr^{6+} reach of 94,38% and metal ion of Cd^{2+} reach of 56,72%. Adsorption efficiency for continue method for textile reaktif dyes reach of 95,54%; metal ion of Cr^{6+} reach of 92,69% and metal ion of Cd^{2+} reach of 63,43%. Adsorption model for batch experiment follow BET isotherm, while adsorption model for continue experiment is follows Thomas isotherm.

Keyword :Adsorption, metal ion of Cd^{2+} , metal ion of Cr^{6+} , Sidoarjo mud, textile dye

STUDI PENGARUH AERASI DAN RESIRKULASI LINDI TERHADAP LAJU PROSES DEGRADASI SAMPAH PADA *BIOREACTOR LANDFILL*

Dian Eni Sunarni, Syafrudin, Endro Sutrisno

ABSTRACT

On the conventional landfill, the waste degradation requires a lot of time to make it through and it produces a methane gas from an anaerobic which could be dangerous if there is not an optimal processing. On this research, the writer uses 7 experimental reactors, 6 reactors given aeration treatments and leachate recirculation. The variations which have been done in the research is leachate recirculation debit, namely (10 and 15) ml/minutes and continual leachate's flowing system and aeration variation, namely (3, 2, and 1) ml/minutes everyday. The parameter which is measured is the reduction of waste volume, temperature, PH, BOD and COD for weekly analysis. The results of the analysis are that the aeration of 1 ml/minutes with leachate recirculation of 15 ml/minutes is the best of aeration condition and it can increase the settlement process and reduction of BOD and COD concentration in a short time of leachate. This reactor can increase the volume reduction as much as 14,14 % in six weeks and it is bigger than control reactor. The concentration reduction of BOD is from 718,24 mg/l becomes 88,44 mg/l and the reduction of COD is from 1285,58 mg/l becomes 893,44 mg/l

Keywords : landfill, waste degradation, aerobic, aeration, leachate recirculation

PENGARUH PENAMBAHAN AIR DAN RESIRKULASI LINDI TERHADAP LAJU DEKOMPOSISI SAMPAH ORGANIK DALAM BIOREAKTOR *LANDFILL*

Monalisa, Syafrudin, M. Arief Budihardjo

ABSTRACT

The objective of this research is to investigate the influence of water addition and leachate resirculation to the rate of waste decomposition of organic waste in the bioreactor landfill. The process of waste decomposition to conventional landfill method needs over long period of time. The bioreactor landfill significantly increases the extent of organic waste decomposition, conversion rates, and process effectiveness over that would otherwise occur within the landfill. In this research were carried out in seven reactors, six reactors were operated with water addition and leachate resirculation, one control reactor without water addition and leachate resirculation. The variation of this research are variation of water addition volume (1 litre, 1.5 litre, and 2 litre) in everyday and leachate resirculation (10 ml/minute and 15 ml/minute) in everyday. The result showed that water addition 2 litre with leachate resirculation 15 ml/minute gave the best anaerobic condition in increasing the decomposition of waste. This reactor had increased the rate of waste decomposition 35,92 % higher than control reactor in 5 weeks, reduced the BOD from 426 mg/l to 82 mg/l and reduced the COD from 832 mg/l to 128 mg/l.

Keywords: landfill, waste decomposition, anaerobic, leachate resirculation, water addition

**PERANCANGAN SISTEM PENYALURAN DAN BANGUNAN PENGOLAHAN AIR
BUANGAN DOMESTIK
KELURAHAN CIRACAS, JAKARTA TIMUR**

Rahayu Indah K, Wiharyanto Oktiawan, Dwi Siwi H

Abstract

Ciracas which is located in East of Jakarta, is inclusive of solid settlement area. Like usual other areas in Jakarta, Ciracas also has many environmental issues. One of them is management of domestic wastewater. Disposal of domestic wastewater from daily activities like bath, washing, and water closet, distributed by drainage channel which supposed to distribute rainwater. For feces management, civiliant still using conventional septik tank as treatment technology. From phisycal condition of this area, Ciracas has flat topograph, high groundwater condition, and low permeability, so onsyte management can no be used anymore because it can be highly potential to polute ground water.

The solution for that problem is changging the management into off site management, means that the distribution of domestic wastewater done by pipelines system (sewerage system), which completed with biological reactor as name as Anaerobic Filter (AF). This way must to do to avoid environmental issues and health problems around Ciracas areas. Beside that, that off site system creating residential which health, estetics, comfort, and suitable living.

Keywords : *Ciracas, On Site System, Off Site System, Sewerage System, Anaerobic Filter (AF)*

OPTIMALISASI INSTALASI PENGOLAHAN AIR LIMBAH (IPAL) PT. BEHAESTEX PANDAAN- PASURUAN)

Silvia Dwika Puspita
Junaidi, ST dan Ir. Mochtar Hadiwidodo

ABSTRACT

PT. Behaestex have had Wastewater Treatment Plant (WWTP) that treatment processes consist of physics-chemical treatment and activated sludge biological treatment. Effluent of WWTP have appropriated for waste water standard according to decision letter of East Java Governor No. 45 in 2002's, except colour parameter. Effluent of WWTP still have high colour content. Another problem is effluent from physics-chemical treatment still have high pH and temperature. The temperature range is in 35 to 45 °C and pH range is in 10 to 11. Optimalization of PT. Behaestex WWTP was done aiming to reduce colour content in wastewater, adjusted to neutral pH between 6,5 to 7,5 and reducing temperature to be less than 30 °C. Optimalization that can be done are optimizing coagulation-floculation unit with determination the dosage of coagulant that effective to reduce colour content. Result of optimalization indicated that the most effective coagulant to reduce colour content is ferrous sulfate with 500-6000 mg/l dosage. The type of Cooling tower to be used is induced draft crossflow cooling tower and pH adjustment with sulfate acid 98% with total requirement 35,8 L/day.

Key Words : Reducing Colour Content, Coagulation-Floculation, Cooling Tower, pH Adjustment

WASTE WATER TREATMENT PLAN EFFLUENT RECYCLE DESIGN PT BEHAESTEX PANDAAN- PASURUAN

Yesi Clara Shinta, Junaidi, Endro Sutrisno.

ABSTRACT

PT. Behaestek Pasuruan is a company which use ground water as the source of clean water because the surface water (river) located quit far from the company site. Because of the Government regulation about the usage of ground water has become stricter, the company is searching the alternative in order to get the sufficient amount of clear water for indusrial needs beside the ground water, one of the method is to recycle the effluent from the Waste Water Treatment Plan (WWTP) and process it into raw water. This raw water will be used for domestic water needs, cooling water, production water, and boiler water. To process this effluent become an acceptable raw water based on the regulation will need a treatment unit which can degradate parameters which exceed the standart from the regulation so it will sufficient for all the company needs. Those standart will be compared with the result from the effluent of the WWTP so can be identified what are the parameters that is need to be removed. The parameters are TDS, hardness, CaCO_3 , Fe, SiO_2 , PO_4 , Cl and color. Those parameters will determine the treatmen alternative that will be chosen according to the effluent quality, investment, operasional and area spacing. From the calculation and analysis, the result is a treatment design which consist of decolorization unit using chlorine (to reduce color), Reverse Osmosis (to reduce the TDS), kation and anion changer (to remove ions which produce hardness and silica). This Waste Water Treatment Plan effluent recycle design cost Rp 2.943.000.000,- as early investmest and Rp. 110.187.368,-per year for the operational maintenance.

Pass keys : Industrial water, Recycle Effluent, Decolorisasi, Reverse Osmosis, Anion Exchanger, Kation Exchanger, Reservoir, Resin regeneration.

**POLA PERSEBARAN AIR LINDI DI SUNGAI DENGAN PENDEKATAN
PARAMETER TEMBAGA (Cu) MENGGUNAKAN SOFTWARE SURFER 8
(STUDI KASUS : SUNGAI KREO)**

ADITYO UTOMO

ABSTRACT

Kreo river, one of the river in Semarang, is the raw material used for drinking water. Flows from upstream in Ungaran and through Jatibarang landfill. During Kreo river drainage received input waste water Jatibarang leachate from the landfill. Given the distance of the landfill with PDAM Kaligarang not more than 40 km, this becomes a serious problem of river water quality. Water leachate is discharged into the River Kreo contain substances harmful pollutant for living things, such as copper. Level of copper in the leachate water is dumped in the river has Kreo levels that exceed the quality standards for drinking water quality. The required levels of copper in the water according to the PP. 82/2001 of 0,02 mg/l. Concentration levels of copper in the leachate in the ground water is 0,140 mg/l. Research carried out to identify the concentration of Cu at different points sample, namely S1 : 0,085 mg/l; S2 : 0,078 mg/l; S3 : 0,069 mg/l; S4 : 0,050 mg/l; S5 : 0,036 mg/l. Cu concentration also influenced based on season, rainfall, and garbage into the landfill. Then find the pattern of Cu concentration distribution in the flow of the river to determine the distance distribution of Cu. From the result of research and calculation by a systematic analysis estimated that the levels of copper can capable in meeting the quality standards after a distance of 4 km after this point IPAL outlets. With the assumption of pollutant sources from leachate IPAL outlets, and has a flow speed of the average for 0,453 m³/dtk.

Kata Kunci : air lindi, pola persebaran, tembaga

**PERENCANAAN INSTALASI PENGOLAHAN LUMPUR TINJA (IPLT)
KABUPATEN SEMARANG**

Endah Setyowatie

ABSTRACT

Septage Treatment Plant is an instance of wastewater treatment which is located only to receive septage through car or truck (without any piping). Up to now, septage draining services of the society of Semarang Regency is did by the septage suck services from Semarang City which relatively far in distance. This condition causes the septage suck services unwilling to throw the septage to Septage Treatment Plant of Semarang City, they throw the septage into surrounding water body. Septage Treatment Plant of Semarang Regency is located in Blondo Village, district of Bawen. The area of draining services are District of Ungaran, Bergas, Bawen, and Ambarawa. The applied technological preparation is pond sistem, with preparation debit at $8.28 \text{ m}^3/\text{day}$.

Key words : Septage, pond sistem, Semarang Regency

EVALUASI SISTEM PENGELOLAAN SAMPAH MEDIS DI RUMAH SAKIT Dr. KARIADI SEMARANG

MEIKA DWI NASTITI MULYANINGSIH

Sri Sumiyati, ST, MSi Ir. Nasrullah, MS

ABSTRACT

Medical wastes are waste materials produced from medical treatment, patient care, pharmacy and others which are infectious, contain of hazardous chemical compound and contaminated sharps. Medical wastes are categorized as hazardous waste that can threaten human health or the environment because they are potentially harmful. Because of their characteristic, medical wastes need a special treatment system which is separated from general wastes.

RSDK is one on the biggest medical waste producer because of its service capacity. That is way the RSDK has a responsibility to build a good medical waste treatment system. This evaluation was held to identify condition of the medical waste treatment system in order to minimize the risk. This evaluation was using the benchmark based on the regulation and literatures.

Medical waste treatment system need to be increased by optimize the process. This optimize process is including making better process and addition of the component based on the results of the evaluation. Medical wastes were from the rooms of the hospital which the bulk sizes of these wastes are various, depends on the kind of service activities in the rooms.

The amount of wastes is 4.46% from the whole hospital's waste or 89.15 Kg/day. And the amount of medical waste that has been burned in the incinerator is 25.35% from the total medical waste produced by RSDK.

Key words : medical waste, hospital, treatment system, evaluation, optimization

RENCANA PENGEMBANGAN TEKNIK OPERASIONAL SISTEM PENGELOLAAN SAMPAH KOTA JUWANA

Nur Islami Y. Luthfiati; Ika Bagus Priambada, ST, M. Eng; Ir. Irawan Wisnu W, MS

Abstract

The Juwana city is one of a developed potencial region that include in A WANARAKUTI (Juwana-Jepara-Kudus-Pati) economic unity region. This city has 43.282 population in 2005 with the growth rate of population is about 1,308 % per year. The developing of population, is followed by the increasing of society's consumption and other activities which would increase solid waste production. In 2005, the amount of wastes is 133,896 m³/ day and the development of bulk sizes of these wastes is about 0,4 % in a year. Rank of waste management service is 39 % and service distribution is 50,47 %. One of important aspects that cause low degree in waste management service is the aspect operational technology usage. This aspect includes waste handling, stirage, collection, transfer and transport. The evaluation and waste operational technology development program will held to increase distribution area to all of the Juwana City and held to increase waste management service up to 90 %.

Key word : waste management, operational technology, development

STUDI PENGARUH PENCAMPURAN SAMPAH DOMESTIK, SEKAM PADI, DAN AMPAS TEBU DENGAN METODE MAC DONALD TERHADAP KEMATANGAN KOMPOS

Ir. Endro Sutrisno, MS*, Badrus Zaman, ST, MT**, Deasy Yudha Arimbi***

This research using the domestic organic garbage which is mixed by rice bran and cane pulp, with the variation of mixing pursuant to ratio C/N and moisture is, cane pulp : domestic organic garbage equal to 1:4, 2:7, rice bran : domestic organic garbage, 1:4, 2:7, and also the mixture cane pulp : domestic organic garbage : rice bran, 2:10:2, 1:7:1. Conduct attempted by aerobic and Mac Donald method.

So that pursuant to the research can be taken conclusion that mixing lock up the rice bran and cane pulp with the domestic organic garbage is slow down the compost maturity so that unnecessary of cane pulp mixing and rice bran of at domestic organic garbage composting, compost quality of result of mixing as according to value of compost quality at SNI 19-7030-2004. Composition which it faster the compost maturity is control and composition which it has good ratio C/N from 6 variation is variation AS 27 which it consists of two cane pulp and seven domestic organic garbage.

Key Words : Compost, Rice Bran, Domestic Organic Garbage, Cane Pulp, C/N Ratio and The maturity of Compost

IDENTIFIKASI DAN PENGELOLAAN SAMPAH

PUSAT PERBELANJAAN

(Studi Kasus : Pusat perbelanjaan ITC Cempaka Mas, Kelurahan Sumur Batu, Kecamatan Kemayoran, Jakarta Pusat)

Oleh : Wahyu Puspita Sari

ABSTRAK

ITC Cempaka Mas located in Jl. Letjen Suprpto, Central Jakarta is grocery shopping centre and biggest grocery business centre in South East Asia which provide the entire requirement of society. First stage in this research is collecting data and literature, continue with randomly garbage take 1 m³, to be separated and measured of its volume and composition. The last stage is planning waste management which based to hierarchy of waste management. Implementation of waste management in ITC can reduce garbage volume more than 50 % per day. It also can reduce needs of TPA area and transportation cost. This waste management need higher operational cost but after sale of compost and recycle goods, this management will save Rp 21.760.235 per month.

Key word : waste management, ITC Cempaka Mas

PENGOMPOSAN SAMPAH

DAUN ANGSA (*PTEROCARPUS INDICUS*) DAN GLODOKAN (*STACHYTARPETA SPP.*) DENGAN PENAMBAHAN JERAMI, PUPUK KANDANG DAN TETES TEBU MENGGUNAKAN KONSENTRASI *TRICHODERMA Sp.* YANG BERBEDA

ADI NUGROHO

Ir. Syafrudin, CES, MT.

Ir. M. Arief Budihardjo, MEng. Sc.

PENGELOLAAN SAMPAH MENUJU ZERO WASTE DI KELURAHAN KEBONMANIS CILACAP

Dian Ika Ratnawati

Ika Bagus Priambada, ST, M.Eng

M. Arief Budihardjo, ST, M.Eng Sc

ABSTRACT

Limitation of available of TPA area and the increasing of garbage piled up volume every year oblige government to apply method of inwrought garbage processing which can lessen of garbage piled up volume thrown to TPA. Garbage management planned is zero waste concept which apply composting technology and recycle which aim to lessen garbage piled up volume yielded to TPA. Garbage processing with zero waste concept enclose grouping, composting, and gathering of ex goods. Recycle and composting concept able to reduce transported garbage piled up to TPS/TPA in Kelurahan Kebonmanis Cilacap equal to 75%, that is from 23,638 m³/day become 5,821 m³/day. Garbage management of zero waste able to degrade garbage volume to be thrown to TPA so that will affect also at degradation of area requirement of TPA, decreasing cost of TPA area. Decreasing cost of TPA area equal to Rp288.741.429,00/years become Rp79.006.338,00/years, operating cost lower than conventional system from Rp849.543.424,00 become Rp579.843.718,00. Zero Waste applied has to be preceded with socialization to the public since pursuant of survey that 56% of society indisposed for to do something garbage dissociation, others also need fund support from government.

Keyword : Waste management, zero waste.

**ANALISA RESIKO LIMPASAN LOGAM DALAM LINDI
TPA JATIBARANG TERHADAP KUALITAS
SUNGAI KREO
(STUDI KASUS)**

ALFIA DIANANITA ZULFA

Wiharyanto Oktiawan, ST, MT. Ika Bagus Priyambada, ST, M.Eng.

ABSTRACT

Landfill's leachate consists of many chemistry compound comes from dilution and process in landfill, including heavy metal. Jatibarang landfill's leachate flows into Kreo's river ends in Kaligarang river, source of PDAM Semarang City.

Risk assessment research consist of four phase; hazard identification, exposure assessment, toxicity assessment, and risk characterization. Results of hazard identification to five parameter (Fe, Mn, Cr, Zn, and Pb) shows maximal concentration in landfill before flows into Kreo's river is 22,775 mg/l for Fe, 9,625 mg/l for Mn, 1,095 mg/l for Zn, 1,5 mg/l for Cr, and no detection score for Pb. Results of screening shows three dominant parameter; Fe, Mn, Cr with total chemical score is 99,94%. Exposure assessment shows that the highest concentration level of Fe, Mn, Cr comes from sample's location near Jatibarang's leachate run off; 3,85 mg/l for Fe, 1,89 mg/l for Mn, and 0,266 mg/l for Cr. Reggression equation for Fe with interval distance is $y = 3,839 - 4,91x$, Mn : $\log y = 0,213 - \log 0,519x$, Cr : $y = 0,203 - 0,0519x$. Incresing interval distance make less concentration level for Fe, Mn, Cr. Results of toxicity assessment shows that intake Fe in location 1 – 10 exceeding limit level, Mn in location 2 – 10, Cr in location 2 – 6. From risk characterization we can know the highest hazard index for Fe, Mn, and Cr located in near Jatibarang's leachate run off. Hazard index for Fe in point 1 – 10 can't be accepted with equation $Y = 20,612 - 2,596x$ for men and $= 23,839 - 3,109x$ for woman. Index for Mn in point 2 – 9 exceeding limit level with equation $\log Y = \text{pria } \log y = 3,739 - \log 2,589x$ for men and $\log Y = \log y = 0,495 - \log 0,735x$, for woman. Index for Cr in point 2 -4 can't be accepted with equation $\log y = 0,9119 - \log 4,274x$ for man and $\log y = 1,0479 - \log 0,508x$ for woman.

Keywords : leachate, heavy metal Fe, Mn, Cr, risk assessment, hazard identification, exposure assessment, toxicity assessment, and risk characterization

**OPTIMALISASI IPLT SEMARANG
DENGAN PENGOMPOSAN LUMPUR TINJA**

Gemala Madumetha¹⁾, Wiharyanto O. ST, MT, Ika Bagus P. ST, M.Eng.²⁾

Abstract

Semarang Septage Treatment Facility is a septage manufacture which serves Semarang City district. At this moment, the facility is disfunction because the septage pile up in the anaerobic pond. Because of that, Semarang Septage Treatment Facility has to be evaluated which is consist of technical, infrastructure and management evaluations. As the results of the evaluation, the new anaerobic pond is recomended in 2007, so as the new sludge drying bed in 2005 and 2010.

The septage of Semarang Septage Treatment Facility is very huge that is about 3 m³/day. The solution that can be taken is composting. The septage is fulfil the compost characteristic after it was dried in 30 days. The management of septage composting are consist of transportation, sifterization, weighing and packaging, and also transportation and storage. The price of compos product is Rp 440,00/kg in 2005 and it will rise to Rp 707,00 in 2014. It is relatively cheap if it is compared with the prices of another fertilizers, so it is proper to sold in the market.

Keyword : septage treatment facility, septage, compost

EVALUASI DAN PENINGKATAN SISTEM TEKNIK OPERASIONAL PERSAMPAHAN KOTA PEKALONGAN

Ledy B.S.Hutasoit

Ika Bagus Priyambada, ST, Meng

Ir. Widiarto

Abstract

Along with the growth of human population in the city and urbanization, the production of solid waste is also increase. The uncontrolled waste may disturb the health of human beings and not good in esthetics condition. The solid waste problems are also happened in Pekalongan. In 2002, the amount of of solid waste is 724,00 m³/day and 77% collected. This condition happens because 3R (reduce, reuse, recylce) program is not adopted in Pekalongan. The management of solid waste in Pekalongan also has some constraints. The constraints are almost 50% of waste of transportations is exceeding its period of job according to SK SNI-T-12-1991-03 (DPKLH, 2005), just 42 main streets are swept among 148 others main streets because the lack of transportation and many vehicles is aged (DPKLH, 2005) and final disposal site in Degayu is full of solid waste. One of management solid waste aspect is operational technology. This aspect is important because it is related with efficiency of waste operational where storage, collection, gathering, transportation and disposal site is managed in this aspect. In this planning, waste management service is increased until half of uncollected waste according to Millennium Development Goals (MDGs) about 89%. Beside that, operational technology is increased and 3R program is applied about 27,5%.

Key word: waste management, increased operational technology, 3R (reduce, reuse, recylce)

ALTERNATIF PEMANFAATAN SAMPAH ORGANIK

UNTUK BIKET ARANG SEBAGAI BAHAN BAKAR

MARIANIK

Dra. Suparni Setyowati Rahayu, Msi Nurandani Hardyanti, ST, MT

ABSTRACT

Charcoal Briquette was obtained charcoal by burning without air (pyrolysis) of dry biomass. Making of charcoal briquette conducted by exploiting organic household garbage enhanced paddy chaff and sawdust with starch as its glue. Charcoal briquette from organic garbage of household with paddy chaff and sawdust used as alternative energy because having heat value big enough and abundance source of raw material. Variety materials composition have been yielded charcoal briquette of organic garbage with sawdust having rate irrigate 5.53 - 8.82 %, dusty rate 3.581 - 3.843 % and heat value 3894.520 kal / gr - 4292.180 kal / gr. While for the charcoal briquette of organic garbage with paddy chaff have rate irrigate 2.95 - 5.65 %, dusty rate 3.439 - 3.627 % and heat value 4030.73 kal / gr - 4470.160 kal / gr. Exploiting of organic garbage of household with this paddy chaff and sawdust could be lessen amount arise existing garbage

Keyword: Organic household garbage, sawdust, paddy chaff, charcoal briquette, alternative energy, water rate, dusty rate and heat

PENGOMPOSAN AMPAS TEH HITAM DENGAN PENAMBAHAN KOTORAN KAMBING DAN EM4

Bramesti Endra Hapsari*, Syafrudin, Badrus Zaman****

ABSTRACT

Black tea waste composting needs dryer material to absorb moisture of waste which is to be left. Dryer material used is goat manure. To make faster composting process and decrease rot smell potency which is out from heap, so used Effective Microorganism 4 (EM4). This research have direction to know characteristic of mature compost, the optimal comparison of mixing composition black tea waste and goat manure with EM4 addition, and cost needed to make compost. Variations taken are control variation (black tea waste), A variation (black tea waste + 30 ml EM4), and B variation (black tea waste : goat manure + 30 ml EM4). B variations include B1 variation (1 : 1), B2 variation (3 : 2), B3 variation (7 : 6), and B4 variation (7 : 8).

Based on research has done, characteristic mature compost that be resulted is (a) Control variation : organic C 40,586 %, N 3,125 %, ratio C/N 12,99, P 0,540 %, K 0,364 %, moisture 50,445 %; (b) A variation : organic C 42,833 %, N 3,548 %, ratio C/N 12,07, P 0,535 %, K 0,405 %, moisture 52,680 %; (c) B1 variation : organic C 18,300 %, N 1,063 %, ratio C/N 17,22, P 0,439 %, K 1,614 %, dan kadar air 42,942 %; (d) Variasi B2 : C organik 10,791 %, N 1,066 %, rasio C/N 10,12, P 0,519 %, K 1,598 %, moisture 48,181 %; (e) B3 variation : organic C 12,411 %, N 1,063 %, ratio C/N 11,68, P 0,581 %, K 1,608 %, moisture 46,464 %; and (f) B4 variation : organic C 21,032 %, N 1,058 %, ratio C/N 19,88, P 0,501 %, K 1,830 %, moisture 38,097 %. The optimal compost is B3 compost with compost cost making is Rp. 354,38 / kg.

Keywords : Compost, Black Tea Waste, Goat Manure, EM4, C/N Ratio, Compost Quality

**STUDI SOLIDIFIKASI ABU ENDAPAN LIMBAH BATU BARA DENGAN METODE
SOLIDIFIKASI (STUDI KASUS LIMBAH BATU BARA PT. PRIMATEXCO, BATANG
- JAWA TENGAH)**

Silviana Sari Dewi¹⁾, Syafrudin¹⁾, Badrus Zaman¹⁾

**DETAIL ENGINEERING DESAIN (DED)
TEMPAT PEMBUANGAN AKHIR (TPA) TUNJUNGSETO
KABUPATEN KEBUMEN**

Kurnia Endwi Aprilianti^{*)}, Sri Sumiati Winardi, Dwi Nugroho

ABSTRACT

The increasing of development in many sector because the increase of solid waste in a city. The problems become worse along with the decrease of land disposal which become small to manage solid waste self-supportingly. Kebumen regency government plan to make a new landfill which will use to help the both of the existing landfill which have been operate before. The site selection study have been done in 2003 and decided Desa Tunjungseto Kecamatan Kutowinangun as the alternatif of landfill which have ± 3 Ha to serve the solid waste from Kecamatan Kutowinangun and Prembun. The landfilling metode has been chosed is sanitary landfill. After make an anlysis based on the existing condition of solid waste management in Kebumen regency and location had been choosen, than the calculation from the land required, cell dimension, the access road, leachate treatment facilities, drainage facilities, and other equipment facilities was done. The requirement land is 5,592 Ha, so it can only serve for 10 years. It can use until 12 years if we applicate the recycle and composting, and to serve until the end of plan (2025) solve by reuse the land (digging the cell which the waste have been turn into a compost). The cost needed to make this plan is Rp12,148,750,737.14 wich part in 3 step.

Key word : landfill, sanitary landfill, solid waste, Kebumen regency

**OPTIMASI PENGUMPULAN DAN PENGANGKUTAN SAMPAH KOTA DENGAN MODEL
POWERSIM
(Studi Kasus : Kota Semarang)**

Jatu Pramagista A. N¹⁾, Badrus Zaman²⁾, M. Arief Budihardjo²⁾

ABSTRACT

Collecting and transporting waste were problems on Semarang City. Semarang, one of the metropolitan city in Indonesia have population 1.431.112 people. Optimalization and efficiency of waste collecting and management needed waste management by Powersim dynamic model. The Powersim programe was window based computer software created dynamic system model by design simulation . Simulation of waste collecting and transporting in Semarang city was drafting. Drafting done by choose dependence factors those have interaction and relationship. Effective waste management. needed to increasing optimalisation and efficiency of waste collecting and transporting by Powersim dynamic model. Furthermore, draft were formulated as model; abbreviation, pictures and analyses, respectively. Model simulation done by entry data to know have the caracer of waste collecting and transporting. data input for waste collecting were waste volume and waste transport equipment . Data input for waste transporting were waste volume in temporary waste collecting and waste transport equipment. The experiment conclusion in the existing condition of collecting and transporting in Semarang city were not optimal. Optimation effect on collecting and transporting process was increased. Although waste were transported. Rekomendation of collecting and transporting repairs on collecting process consist (1) 1300 becak ; capacity 0.82 m² were used by two rotation and daily operation; (2) 15 dump truck, capasity 6 m³ were used. Transportation repairs used 60 arm roll by six rotation, 6 m³ capasity, daily operation.

Key words : collecting and transporting, powersim.

**PENGOMPOSAN LIMBAH PERTANIAN JAGUNG DENGAN
PENAMBAHAN KOTORAN SAPI DAN BEKATUL MENGGUNAKAN
DOSIS EKSTRAK RUMEN YANG BERBEDA
Dian Ekawati, Endro Sutrisno, M. Arief Budihardjo*)**

ABSTRACT

Composting is one of the alternative efforts in overcoming solid waste problems. This alternative can be used for solid waste that comes from domestic, industrial or even agricultural waste. An example on agricultural solid waste is from the corn field at Kecamatan Bayan, Kabupaten Purworejo. Solid waste from the corn fields need a proper handling. The solid waste is burn down or just piled up. The amount of solid waste can reach 6 – 10 m³ in each hectare.

The purpose of this experiment is to know the process during composting, to compare the quality of the according to SNI-19-7030-2004 by Soetopo (1999), and other compost. This experiment consist one control with 8 variations of compost pile. Each pile has a proportion of straws, stems, branches and cow manure as 2 : 3 : 3 : 4 with or without an addition of bran and rumen extract in different doses. The composting process is done in laboratorial scale, and is an aerobic process.

The experiment shows that not every variation of compost fulfills the accepted quality of ripe compost. The most optimal compost pile is the one of with the H variation which using 1,5 kg straws : 1,5 kg branches : 1 kg stems : 2 kg cow manure without bran and rumen extract. This pile contains C-organic 6,93 %, N-total 0,42 %, C/N ratio 16,50 %, P-total 0,64 %, K-total 0,19 %.

Keyword : compost, straw, stem, branches, cow manure, bran, rumen extract, C-organic, N-total, C/N ratio, P-total, K-total.

**STUDI PENINGKATAN MANAJEMEN
TEKNIS OPERASIONAL PENGELOLAAN SAMPAH
KOTA WONOGIRI**

Sigit Wijayanto; Irawan Wisnu Wardana, Widiarto

OPTIMALISASI SISTEM PENGELOLAAN IPLT KABUPATEN CILACAP

Rizky G.D ; Mochtar H ; Wiharyanto O.

ABSTRACT

Regency of Cilacap is one of regens which is located in Central Java with 1709908 population and 225360,840 He area wide, which is consist of 24 subdistricts. In order to increase its public health, it was constructed a septage treatment plant (IPLT). The worse of IPLT management system cause IPLT does not work optimize. The discharged capacity reaches 25 m³ /day but only 8,89 m³/day septage is processed. In order to increase IPLT effectiveness, evaluation and optimization need to be done which is concerning 5 IPLT management aspect. The mentioned five aspects are inkudes institution, financial, legal, operational and technical, and also social aspect. With evaluation concerning to those aspects it is expected that the optimization IPLT management system and process will be occurred. The evaluation result shows that IPLT of Cilacap needs to expand its service area, make regulation about IPLT management, explicit distribution of duty and responsobility and also addition and repair IPLT mangement and operational infrastructure to optimize its work and function

Key word : Septage, Management System, Optimization

**PENGARUH TINGKAT PENDAPATAN TERHADAP JUMLAH TIMBULAN SAMPAH
(Studi Kasus Pemukiman Teratur pada Kawasan Pantai Perumahan Tanah Mas
dan Kelurahan Bandarharjo)**

Ekti Oktavianingsih¹⁾, Ika Bagus P²⁾, W.Oktiawan²⁾

ABSTRACT

Now, waste and its management become an insist problem in cities of Indonesia. The most appear problems in city waste management are the operastional cost problem and the difficult to find a suitable place for waste disposal. Agree or not, in the fact, the increasing of population and the life style give a big influence to the waste volume. One of the increasing heap waste caused in population are the increasing of income level and the consumption behaviour of population. The purpose of this research are to know the amout of heap waste in population with different income level and different consumption behaviour. Hope tihis research can give a solution for the problem in waste management based on income level.

Key words : heap waste, level income, consumption behaviour, waste management

EVALUASI DAN OPTIMALISASI PENGELOLAAN PERSAMPAHAN KOTA BOYOLALI

Winardi^{}; Irawan^{*}; Andriyanto*

Abstract

In 2004 Boyolali City has 66870 people. Boyolali City had a good geografic position for expanding. With increasing of the developing city, activity level and social economics Boyolalii City attend garbage volume from day to day. In 2004, garbage volume has reach 90 m³ /day. Garbage treatment services level has 66,67%. The garbage volume increasing made garbage volume intend to rise from 2,5048 l/person/day in 2006 to 2,8130 l/person/day in 2018. Garbage volume analysis for projection period 2006 to 2018 show municipal services level in Boyolali City rise from 66,67% in 2006 become to 85% in 2018. Operational technical aspect expanding (saving, collecting, transporting and final dumping) must be supported by active participation from garbage origin, and may also cooperation from government institution. Besides that, legal aspect must be make environmental regulation for anticipate environmental pollution influenced by garbage. In the end, garbage treatment in Boyolali City can reach more effective and efficient.

Keywords : garbage volume, garbage treatment services, garbage treatment.

STUDI PEMILIHAN LOKASI TEMPAT PEMBUANGAN AKHIR SAMPAH DI KABUPATEN TEMANGGUNG

Muji Siswati, Ika Bagus Priyambada, Widiarto^{*)}

ABSTRACT

The sitting of a landfill is one of the most difficult tasks faced in implementing solid waste management. Landfilling is the oldest method of waste disposal practised by man. This method is engineered construction and operation by disposing of solid waste on land without creating nuisances or hazard to environment. Most of the difficulties can be resolved with attentive site selection. The site selection of landfill is has purpose to look for a proper area in order that the selected landfill eventually have allotment that appropriate with regional planology plan and fullfil advisability selection criterion of regional and elimination. The district of study that is Sub Province of Temanggung and the district service of trash heap become two district that is district of I and district of II with service center of district of I is Temanggung and service center of district of II is Parakan. To the each district have landfill alone. This matter is meant to give efficient service guarantee in trash heap operasional among others efficiency to vehicle of operational, personal and rihting. Be based on research with relate at selection criterion of regional and elimination be found two candidate of landfill to each district service that is candidate to district of I reside in Keblukan and Kemloko. While to district of I reside in Nglondong and Bojonegoro. The candidate of landfill obtained to be assessed by using advisability parameter of SK SNI T-11-1991-03, Le Grand and Hagerty. Result of research indicate that the candidate of selected landfill for district of I is on Kemloko regional of Kranggan with wight value of SK SNI T-11-1991-03 that is 494, value of Le Grand that is extraordinary farm class value of goodness with accepted sure is acceptance storey and value of Hagerty that is 66,59 SRP. While the selected landfill of district of II is on Nglondong regional of Parakan with wight value of SK SNI T-11-1991-03 that is 504, value of Le Grand that is extraordinary farm class value of goodness with accepted sure is acceptance storey and value of Hagerty that is 66,04 SRP. Seen result of wight, hence the best of candidate location of landfill is Kemloko and Nglondong.

Key Word : *The site selection of landfill, SK SNI T-11-1991-03, Le Grand, Hagerty, Sub Province of Temanggung*

STUDI PEMILIHAN LOKASI (SITE SELECTION) TEMPAT PEMBUANGAN AKHIR (TPA) SAMPAH KOTA CILACAP

Merry Yohana P; Syafruddin; Ika Bagus P

ABSTRACT

Basically, activity of final accumulate operation solid waste in landfill is activity transforming land and activity of which can generate damage / decline of land resource, air and water. To reduce as many as possible negative impacts which generated, landfill require to be designed, to be built and operated better. Effort which do not less important is look for good land so that can minimize negative impact which generated.

Study of site selection solid waste landfill aim to look for right area so that the location of new landfill suitable to regional planology plan and fulfill criterion screening of regional, elimination, and social . Study area is zone service of landfill eksisting (Landfill Tritih Lor, Jeruklegi, Cilacap) comprises District of Cilacap Utara, Cilacap Tengah, Cilacap Selatan, Jeruklegi and Kesugihan. Problems in landfill eksisting is inappropriate situation of planology plan, capacities have overload, and near from settlement.

Process of site selection solid waste landfill lconsist of 3 steps : regional step, elimination step, and final step. Skoring by parameter Le Grand and SK SNI T-11-1991-03. Results of this study is the location which has highest skor in Le Grand and SK SNI T-11-1991-03. The location in Tritih Ilir, Jeruklegi, Cilacap with Le Grand skor (9) that is good extraordinary land class and SK SNI T-11-1991-03 skor (618), including competent class zona for solid waste landfill.

Keywords : *Site Selection, Solid Waste Landfill, Cilacap, Le Grand and SK SNI T-11-1991-03.*

**PENINGKATAN POTENSI EKONOMI SAMPAH ANORGANIK MELALUI UPAYA
PEMISAHAN SAMPAH DENGAN DAUR ULANG DALAM OPTIMALISASI
PENGELOLAAN SAMPAH**

(Studi Kasus : Wilayah Srandol Wetan Kota Semarang)

Veronika Dewi Aryati ^{*)}, Ika Bagus Priyambada ^{**)}, Winardi Dwi Nugraha ^{**)}

ABSTRACT

Srandol Wetan which located in Kecamatan Banyumanik, Semarang city, recently has developed as an mixture area. It has a high potential for recycling inorganic solid waste up to 20,88 m³/day, but it has not been managed optimally. The existing solid waste shows that organic and inorganic solid waste aren't separated from their sources, so both kind of garbage was piled up. Usually people throw away inorganic garbage to TPS because they are assumed that it could not be recycled and have no economic value anymore. If the pile of garbage in TPS increase then it would be accumulate in TPA. The objectives of this research are to know the quantity of inorganic solid waste and the potential economic value from its recycled material so the planning of tehcnical operational for solid waste management through recycle concept can be determine. The method of sampling for this research based on SNI 19-3964-1994. The quantity of inorganic garbage which sold by scavengers before optimalization is 515,413 kg/day with the prediction of scavengers's income around Rp 381.304,00 per day. After the optimalization, the quantity estimated as 883,119 kg/day with the prediction of scavengers's income is around Rp 653.334,00 per day and the economic potency to the value of Rp 791.538,00. Recycle concept would increase the scavenger's income about 149%, and the operational cost could be reduce into 31,75%.

Key words : recycle, inorganic solid waste, economic potencies

EVALUASI DAN PENGEMBANGAN PENGELOLAAN PERSAMPAHAN KOTA DEMAK

JAHRUDDIN

ABSTRACT

Garbage is remainder product from daily human activity in a row with citizen increasing and activity developing at all kinds of humanity sector. Garbage is solid waste including inorganic and organic substance which not useful considerable and must be arrange in order that not endanger environment and protect the developing investment Urban garbage is an available waste in the city which not including dangerous and toxic waste. In addition of human population following by people movement to city was caused garbage volume increasing that must be arranged daily. In apart of that, high waste volume was influenced by expanding society level. These cause arranging of waste problem is become an challenge that must be faced by city development. Most of city in Indonesia was experienced with waste management including Demak city. In this year, service level in Demak city is 70% with appear waste value is 2,5 liter/people/day. Predictable in 2016, appear waste value is 3,31liter/people/day. Bad waste management will cause environmental problem. In order that waste management need concerning and comprehensives actions after all will not cause a problem in the next day. Result of study is plan to 90% with improvement and the developing of institution, operational, law, fund, and society role.

Keywords : Garbage, Garbage Production, Solid waste managemen, Demak City

**STUDI KELAYAKAN PEMBANGUNAN
INSTALASI PENGOLAHAN LUMPUR TINJA (IPLT)
KOTA SALATIGA**

Nasrullah¹, Dwi Siwi Handayani¹, Aryati Rahayu¹

ABSTRACT

Salatiga plans to build Septage Treatment Plant (IPLT) to treat septage from septic tank before it's thrown to the environment in order to increase Salatiga environment sanitation healthy. Based on the healthy department of Salatiga data in 2005, about 79% population in Salatiga has used septic tank and when in time it will be full and need to be drained. Basically, all of Salatiga area will get septage draining service, but people who live in urban area, which have higher density population, will get first priority of draining service because it is assumed that urban people will do the draining more often than people who live in rural area. The IPLT is planned for 20 years with 6 m³/day discharged capacity and use Stabilization Ponds system. Feasibility study is done in order to know if IPLT feasible or not to be constructed observed from technical, financial, social-economic, environmental, and regulation aspects. The cost of investment as big as Rp. 722.207.600 (include tax 10%). The result of investment plan evaluate that IPLT is not feasible to be constructed based on financial aspect because its payback period cannot be reached until the last planned year, internal rate of return (IRR) also cannot be reached until the lowest interest and benefit cost ratio less than. But the IPLT can still be constructed because other aspects can still support it. The analysis result shows that IPLT has also social-economic benefit and its construction is supported by people of Salatiga. The construction of IPLT has also considered environmental aspect such as the impact estimation and environmental managing and monitoring plan. Besides, the construction of IPLT has to be supported by regulation aspect such as region regulation about retribution drawing and regulation to throw septage to the IPLT include the criminal sanction for people who break the rules. It is all in order to optimize the operation of IPLT.

Keywords : Septage, feasibility study, stabilization pond, environmental sanitation, draining

**DESENTRALISASI PENGELOLAAN SAMPAH PEMUKIMAN TERATUR
(Studi Kasus Perumahan Bukit Kencana Jaya Semarang)**

Syafrudin¹⁾, Ika Bagus P¹⁾, Wiji Ening Lestari

Abstract

Jatibarang's land disposal in Semarang city, has expired on March 2000. But, it has not substitute yet. Departement of Hygiene try to prolong it by separating solid wastes at the first collection which is coordinated by each village head. It is directed to resident communities as the most solid wastes producer. One of them is Bukit Kencana Jaya Resident, which solid waste management system is not optimal yet. We can see it from existing condition of solid waste product by its distribution, only 2,57 m³/day solid waste is carried to land disposal, 0,79 m³/day is managed by scavengers, and 4,63 m³/day is not managed yet. Desentralization of solid waste management is one of alternative to solve that problem. In this system the organic garbages will be composted and anorganic garbages will be recycled. Output of Desentralization solid waste management plan are it will reduce 71,58% solid wastes which is carried to land disposal, increase 345,97% solid wastes which is managed by scavengers, and reduce 30,3% fee of solid waste management and reduce solid waste retribution.

Key words :Desentralization, recycle, compos, solid waste management

EVALUASI DAN PENINGKATAN MANAJEMEN PERSAMPAHAN KOTA PEMALANG

DIDIN S. DAMANHURI

Ir. Syafrudin, CES. MT

Ir. Winardi Dwi Nugraha MSi

ABSTRACT

Pemalang city is a city of Province of Central Java with 239,441 citizens in urban garbage management activity by sub cleanliness and garden department. Increasing city population in a row with society consumption level and other activities to drive addition garbage rising. Garbage rising measurement with sampling method from municipal and non municipal sources shows garbage rising volume is 2,70 liter/people/day. With the expanding of garbage appear per year is 1,22%, garbage volume predictable in 2018 is becoming 3,20 liter/people/day. In 2006, garbage rising in Pemalang city is 645,89m³/day. Transported garbage into TPA was 70% of the whole garbage or 498,65 m³/day. Transported garbage to discard to TPA Pegongsoran with Open Dumping management system. Main case that causing lack of waste service level is inoptimum waste management application. Waste management including five aspects, that is institutional, law, operational, fund, and society role. With evaluation and optimalization of waste management, the developing of waste service in 2018 is plan to reach all of the village in Pemalang city with services untill 90%. In a row of that, was planned to add tools include basin, grouping, moving and transporting tool to TPA

Keywords : waste management, optimalization, development.

**PERENCANAAN
INSTALASI PENGOLAHAN LUMPUR TINJA (IPLT)
KABUPATEN KENDAL**

Mochtar Hadiwidodo¹, Sri Sumiyati¹, Annisa Syahida¹

EVALUASI DAN OPTIMALISASI MANAJEMEN PERSAMPAHAN KOTA KLATEN

Balau Eko Purwanto; Irawan Wisnu Wardana, Nurandani Hardyanti

ABSTRACT

Klaten city is district capital city with number of residents 78.837 in the year 2006 with resident level of growth of 0,477 % every year. Increasing of development speed, residents, and level of activity and social economics Klaten City has triggered the happening of improvement of garbage arising number day after day. In the year 2006 garbage arises volumes yielded 155,782 m³/day with service level reaches 47,49 %. This study aim to evaluate existing condition of Klaten City garbage management system evaluated from institution aspect, technical of operational, defrayal, law, and the role of public. Study is done by the way of data collecting survey, observation and interviews to understand expansion wisdom of region, real condition in field, idea and aspiration from all the interested parties with garbage management. Domestic and street garbage collection is done by garbage cart and tri wheel motorcycle, and its transportation to TPA with Dump Truck. While garbage collection of institution and market is done using container and transportation using Arm roll truck. End disposal of garbage is done by open dumping system in Beteng TPA. From calculation obtained that the garbage operation cost in the year 2006 reaching Rp. 1.376.750.390,00 and in the year 2018 reaching Rp. 4.097.002.606,00. While, with applying of 3R (Reduce, Reuse, and Recycle) hence obtained that garbage operation cost reaching Rp. 1.258.450.942,00 in 2006 and reaching 3.939.337.289,00 in 2018.

Keyword : garbage arises, service level, garbage management

**DESAIN INSINERATOR
SEBAGAI TEKNOLOGI PENDUKUNG PENGOLAHAN PERSAMPAHAN
DI TPA BANYUURIP KABUPATEN MAGELANG**

Endar Adi Wirawan, M Arief Budiharjo ST, MengSc. Ika Bagus Priyambada ST, MengSC

ABSTRACT

Nowadays final disposal as domestic solid waste treatment technology face a lot of problem, the main issue is decreasing number of available area for final disposal development purpose. So the other alternative for domestic waste treatment should be think to overcome this problem. Incineration is a waste treatment technology that involves the combustion of waste at high temperatures. Incineration and other high temperature waste treatment systems are described as "thermal treatment". Type of incinerators that widely use for domestic waste treatment technology is multiple chamber incinerator, it consist of two furnace chamber, primary and secondary chamber. Primary chamber has a operation temperature about 600 – 800°Celcius, primary chamber is use for reducing the volume of solid waste. Secondary chamber has an operation temperature about 800 - 1000°Celcius, and it uses for burning the flue gas from primary chamber. Air pollution control device is use to treat flue gas that result fro burning process in incinerator, so that the air emission from incinerator can complete the air pollution regulation.

PENGARUH KOTORAN SAPI DAN KOTORAN AYAM DALAM PEMBUATAN KOMPOS DI KOTA MAGELANG

M. Aryawan Wicaksono, Winardi Dwi Nugroho, M. Arief Budihardjo^{*)}

ABSTRACT

Composting is a chosen method in solving problems related to domestic waste, industrial waste, and farming waste. Nowadays, Kota Magelang is needing alternative solution to solve their solid waste problems. The height of population rate has made sanitary landfill can not be applied as the only solution. This aerobic research is consist of control and six piles variation with different ratio of composition between organic waste, cow manure, and poultry manure to find acceleration rate and optimum quality. Research is held in laboratorium scale. This research is aimed to find the optimum composition among the mixing of organic waste, cow manure, poultry manure and to find the optimum quality based on SNI-19-7030-2004, Asosiasi Barak Kompos (2005) and other research (Ekawati, 2006). The result shown that all variation has fulfilled qualification standart. The most optimum pile regarding to ripe time is variation F which has made from 7,2 kg organic waste+ 1,4 kg cow manure + 1,4 kg poultry manure. Variation F is needed 31 days to ripe. The most optimum pile regarding to quality is variation E which has made from 7,8 kg organic waste+ 1,1 kg cow manure + 1,1 kg poultry manure. It contains 26,15% C-organic; 1,86% nitrogen; 14,05 %C/N ratio; 1,02% phospor; 1,76% kalium; 32,78% water content, and PH result 7.4. Compost with variation E is riped in 34 days.

Key Word : *compost, aerobic, pile, organic waste, poultry manure, cow manure, ripe time, C-organic, Nitrogen, C/N ratio, Phospor, Kalium, Water content, PH*

STUDI PENGEMBANGAN TEKNIS TPA GUNUNG TUGEL KOTA PURWOKERTO KAB. BANYUMAS, JAWA TENGAH DENGAN SISTEM SANITARY LANDFILL

Enrile Indro Prasetyo, Syafrudin, Badrus Zaman

ABSTRACT

Landfill is a major issue in most of Indonesian cities. Without a proper treatment landfill can be hazardous to the environment. Leachate water can be adverse if polluted the under ground and surface water. Methane gas which is a natural by product of anaerobic microbial activity in landfill , will burnt of refuse if trapped in the landfill and also will explode the refuse stack. Sanitary landfill system is the most effective method to minimize the bad effect of landfill to the environment. Gunung Tugel final disposal is an open dumping final disposal. Open dumping system is prohibited by the international law. The increasing population, and Gross Regional Domestik Product of Purwokerto city will generally increased the amount of refuse and also will actually shortened the operational time of the Gunung Tugel final disposal. To increase the amount capacity of the Gunung Tugel final disposal, it is necessary to expand the existing area and redesign it with sanitary landfill method to reduce environmental risk. The purpose of this study is to design technical development of sanitary landfill final disposal in Gunung Tugel final disposal which can accommodate all kinds of proper refuse treatment activities. The results of this study is a new sanitary landfill final disposal design with leachate collection system, gas venting device, other supporting facilities, including truck scales, and also additional heavy equipment requirements. The expense budget to built this Gunung Tugel sanitary landfill design is approximately Rp. 7.708.865.262,00.

Keywords : design, Gunung Tugel, landfill, sanitary

OPTIMALISASI PENGANGKUTAN SAMPAH DI KABUPATEN REMBANG DENGAN MODEL POWERSIM V 2.5

Sugiarti , Ika Bagus Priyambada, Badrus Zaman^{*)}

Abstract

Solid waste is a refuse produced from human or animal activities which is dumped because it no longer has any use, is undesirable, and causes environmental pollution which adversely affects the life. The increase of the population and people's activities increase the volume of the solid waste produced. If the amount and condition of waste transport vehicles aren't sufficient to transport waste, there will be piles of solid waste. The level of waste transport service in Rembang Regency is 67 %. The research results showed that solid waste generated in Rembang Regency is 3,21 liters/person/day. Simulation of Powersim V.25 model showed that in the waste transport system in Rembang Regency, there are some wastes remain because the volume of solid wastes to be sent to the landfill are 1,597.56 m³/week while the volume of solid wastes which can be sent to the landfill are only 1.386 m³/week.

Solid waste sorting to retrieve solid wastes which can be composted or recycled, supplying more transport vehicles, and optimizing the transport vehicle trips are the alternative solutions to improve the waste transport in Rembang Regency. Having been sorted, the solid wastes to be sent to the landfill are reduced. The trips of the 4 dump trucks are increased from 2 trips/day to 4 trips/day, whereas the number of arm roll unit vehicles is increased from 3 units to 4 units.

Keyword: Optimalization, Garbage, Transport, Dump Truck, Arm Roll, Powersim

PERENCANAAN ASPEK NON-TEKNIS OPERASIONAL PENGELOLAAN PERSAMPAHAN KOTA MAGELANG

Eliza Bhakti Amelia¹; Syafrudin²; Sri Suryoko³

ABSTRACT

Population growth and rising activities in Magelang City have been increasing the amount of solid wastes which followed by the complexity of problem solving. Because of that, some actions in waste management field have to be in parallel with urban region development growth and expansion so that environmental quality can be increased. In Magelang City problems of solid waste management have been handled by DPLH (Environmental Control Department) in parallel with some private side and society participation. Human, law and enforcement structure along with its organizational aspects are the key factors in solid waste management in Indonesia. Law and enforcement has to be systematically compiled and evaluated to optimize the system. Organizational aspect for Magelang City ideally is instructed forming into a separate department (Cleanliness Department) among with private sector partnership and society cooperation. Retribution tariff planning embracing crossed subsidy concept which basic retribution tariff burdened equal to 50 % on commercial objects, 40% on bustle objects and 10 % on non commercial objects. Waste separation concept and recycling will reduce about 63,87% waste retribution burdened to society in 2023. And the retribution value no longer burdened to society in the future. Solid waste treatment based on society is an effective solution to minimize retribution cost and to reduce the amount of solid waste that have to be treat at The Final Disposal Plant.

Key words: solid waste management, law and enforcement, retribution, organizational, society participation

**STUDI POTENSI PEMANFAATAN GAS (BIOGAS) SANITARY LANDFILL TPA
BANYU URIP SEBAGAI SUMBER ENERGI ALTERNATIF GAS MEDIUM BTU DAN
PEMBANGKIT LISTRIK
(Studi Kasus : Kota Magelang)**

Miradian Isyana Wistyani , M. Arief Budihardjo, Wiharyanto Oktiawan *)

ABSTRACT

Biogas is an alternative energy resource come from decomposition organic waste occur in landfill. Waste composition of Magelang consist of 69,65 % organic waste, indicate that Banyu Urip landfill have potency in producing biogas for energy resource.

The target of this study is to predict Banyu Urip Landfill's biogas quantity and its economic potency to be used as alternative energy resources, two of them are medium Btu gas as alternative fuel for industrial boiler machine and as electric power generation. Waste and composition measurement sampling method are done according to SNI-19-3964-1994. And then biogas quantity produced estimated by using Landfill Gas Emission Model (LandGEM) 3.02 version.

The result shows Banyu Urip Landfill won't have potency to exploit as medium Btu gas because its quantity is not enough to support the industrial boiler machine, however, it will have potency to generate 53,09 kW small scale electric power. As small scale electric power generation, Banyu Urip Landfill can get income Rp. 13.804.645.996,00.

Key words : Biogas, LandGEM model version 3.02, medium Btu gas, electricity

STUDI OPTIMASI TEKNIS OPERASIONAL PENGUMPULAN DAN PENGANGKUTAN SAMPAH DENGAN MODEL DINAMIS POWERSIM

(Studi Kasus Kota Magelang Tahun 2006-2023)

Linda Rahayu R. I, Syafrudin, Winardi Dwi Nugraha^{*)}

ABSTRACT

Collecting and transporting waste are waste management problems on Magelang, one of the city in Central Java with 117.594 population, thus optimalization and efficiency of waste collecting and transporting management needed to increase service community. Powersim is window based computer software created dynamic system model by design simulation. Simulation model of waste collecting and transporting in Magelang is drafting by determining interaction and dependence element which have a role in waste collecting and transporting. Formed concept is analyzed as model in formula or picture. Input data for waste collecting are waste volume and waste collecting equipment, input data for waste transporting are waste volume in temporary waste collecting and waste transport equipment. Simulation result show that in Magelang's existing condition of collecting and transporting waste is not optimal yet, shown from amount of untransported waste (waste residue). Recommendation of collecting process at 2006 are (1) 150 garbage wagons 0.61 m^3 with two rotation daily operation, 7 garbage cars $4,5\text{ m}^3$ with one rotation daily operation; (2) 124 garbage wagons 0.61 m^3 with two rotation daily operation, 7 garbage cars $4,5\text{ m}^3$ with two rotation daily operation. Recommendation of trasporting process at 2006 are (1) 5 dump truck 6 m^3 with two rotation daily operation, 2 dump truck 6 m^3 with three rotation daily operation, 1 truck 10 m^3 with two rotation daily operation and 1 open basin kijang $4,5\text{ m}^3$ with one rotation daily operation from road transport equipment; (2) 5 dump truck 6 m^3 with two rotation daily operation, 2 dump truck 6 m^3 with three rotation daily operation, and 3 garbage cars from market transport equipment $4,5\text{ m}^3$ with one rotation daily operation.

Key words : waste, collecting and transporting, Powersim.

EVALUASI DAN OPTIMASI MANAJEMEN TEKNIK OPERASIONAL PENGELOLAAN SAMPAH KOTA MAGELANG

Fitri Nurfitasari, Ika Bagus P, Winardi D.N ^{*)}

ABSTRACT

Magelang city is a city of Province of Central Java with 117.594 citizens in the year 2006 where urban garbage management activity by environmental control department. Increasing city population in a row with society consumption level and other activities to drive addition garbage rising. Garbage rising measurement with sampling method from municipal and non municipal sources shows garbage rising volume is 3.14 liter/people/day or 369.209 m³/day and garbage volume predictable in 2023 is becoming 3,56 liter/people/day or 444,28 m³/day. Transported garbage into TPA was 61.10 % of the whole garbage or 225,587 m³/day. With evaluation and optimalization of waste management for projection period 2006 – 2023 the developing of waste service rise from 61.10 % in 2006 become to 90 % in 2023 with service level growth has 1.70 % a year. Operational technical aspect expanding (saving, collecting, transporting, and final dumping) must be supported by active participation from garbage origin, and may also cooperation from government institution. Finally, garbage treatment in Magelang city can reach good effective and efficient.

Keywords : garbage volume, waste management, garbage treatment service

STUDI PEMILIHAN LOKASI TPA SAMPAH KOTA BANJAR JAWA BARAT

Ika Bagus P^{*)}, Dwi Siwi H^{*)}, Lola Nuurul Utami

ABSTRACT

Mostly waste disposal activity causing environmental quality decrease, both abiotic and biotic components, give bad impact for human and his environment. To reduce bad impact and keep environment quality, landfill must be place in right site location and need to designed and built and operated well. The important factor which do not less important is look for good land so that can minimize negative impact which generated.

Study of site selection solid waste landfill aim to look for right area so that the location of new landfill suitable to regional planology plan and fulfill criterion screening of regional, elimination, and social. Area of study is Banjar Town in zone service of Ciminyak Landfill comprises District of Banjar, Pataruman, and Purwaharja. Problems in existing landfill is closing Ciminyak Landfill by Ciamis Government on 2008 so Banjar cannot do disposal activity there.

Process of site selection solid waste landfill consist of 3 steps : regional step, elimination step, and final step. Scoring by parameter Le Grand and SNI 03-3241-1994. Results of this study is the location which has highest skor in Le Grand and SNI 03-3241-1994. The location in Langensari, Langensari, Banjar with Le Grand skor (11) that is very good land class and SNI 03-3241-1994 score (602), include competent class zona for solid waste landfill.

Keywords : *Site Selection, Solid Waste Landfill, Banjar Town, Le Grand and SNI 03-3241-1994.*

**UJI PEMBUATAN BIOGAS DARI KOTORAN GAJAH
DENGAN VARIASI PENAMBAHAN URINE GAJAH DAN AIR
(Studi Kasus Limbah Kotoran Gajah Taman Wisata Candi Borobudur)
Lisa Lusiana, Endro Sutrisno, Nurandani Hardyanti *)**

ABSTRACT

Biogas is a gas produced from biological activities in anaerobic fermentation process and as a renewable energy. This research is to find out the effect between elephant manure, elephant urine, water and starter to reduce biogas production and assess kalor. This research divided into three groups based on the raw material, i.e., elephant manure, elephant urine, water and starter as independent variabe. Observation consist of volume of biogas production and assess kalor. This result showed that 4 kg raw material in 21 days, elephant manure mixture with elephant urine (1 : 2) is the best raw material to produce biogas reached 60800 ml and assess kalor reached 5345,39 kal/lt. elephant manure with elephant urine and water can also prodece biogas, but it is a little reached 20907 ml and assess kalor 4785,69 kal/lt.

Key Words : elephant manure, elephant urine, water, biogas

STUDI POTENSI PENINGKATAN NILAI EKONOMI SAMPAH ANORGANIK MELALUI KONSEP DAUR ULANG DALAM RANGKA OPTIMALISASI PENGELOLAAN SAMPAH

(Studi Kasus : Kota Magelang)

Denok Ambun Suri

Ir. Syafrudin, CES, M.T.

Ir. Winardi Dwi Nugraha, MSi

Abstract

Waste composition of Magelang City in the year of 2006 consists of 69, 65% organic waste and inorganic waste 30, 35%. This composition indicates that Magelang City have potency to lessen its waste by applying 3R concept and by optimizing the role of trash collector in managing inorganic waste. The existing waste management condition shows that organic and inorganic wastes are not separated yet from its source. As a result, inorganic waste (which is still economically valuable and still can be recycled) was brought to TPS. The target of this research is to find the waste amount and potency that can be recycled. These result continued by planning the operational technique with 3R concept in Magelang City Waste Management. The research method in measuring volume and composition of waste is according to SNI 19-3964-1994. The result shows in year 2007, the quantity of inorganic waste that economically valuable before optimalization is 1880,625 kg/day (4 %) and after optimalization is 6245,28 kg/day (13,28 %). While the income of trash collector increase from Rp. 2.424.871,00 per day to Rp 8.052.679,00 per day. By applying this concept, the waste managed by trash collector will increase 495,67% from 17,77 m³/day become 105,87 m³/day in the year of 2023. Beside, by applying this 3R concept Magelang City can reduce the waste operational cost equal to 14, 27%.

Key words: Recycle, inorganic waste, economic potency

STUDI POTENSI KERJASAMA PEMERINTAH DAN SWASTA DI DALAM PENGELOLAAN SAMPAH DI KOTA BATAM

Dian Saputra, H. Nasrullah, Irawan Wisnu W.

Abstract

Solid waste service in Batam City managed by the government with private sectors as partners. Otherwise, the service still less than what was hoping. Garbage and other waste are still showed in every corner of Batam City. The government then intends to cooperate with national and/or international private sector firms to established solid waste management and services for Kota Batam with hope it will be a better management than before. The purpose of this studi is to choose the best form of cooperation to be held from three examined cooperations i.e. service contract, management contract and concession. The cooperation chosen is concession. In order to find out the feasibility of this solid waste management, then the feasibility test is needed with three economic criterias, i.e. Net Present Value (NPV), Internal Rate of Return (IRR), and Benefit Cost Ratio (BCR). Toward this test, also comes with some analysis, including Payback Period, Break Even Point and Sensitivity Analysis.

Keywords: solid waste management, public-private participation, feasibility test

**PERENCANAAN SISTEM PENGELOLAAN SAMPAH TERPADU
PADA KAWASAN KOTA BARU TERENCANA
(Studi Kasus Pada Kawasan Bukit Semarang Baru (BSB) Kota Semarang)**

Agustina Maharani, Ika Bagus Priyambada, Irawan Wisnu Wardhana

**STUDI PEMILIHAN CALON LOKASI
TEMPAT PEMBUANGAN AKHIR (TPA) SAMPAH
KABUPATEN PEMALANG**

Anisatin N*, Syafrudin, Nurandani Hardyanti****

ABSTRACT

The disposal of waste into the ground (land disposal) is the way that always followed in waste treatment, but this land disposal cannot solve the waste problem. Waste disposal will always be difficult part of waste management. The end of final disposal operation in Desa Pegongsoran of Kabupaten Pemalang, its necessary to find a new disposal area. This disposal election study is purpose to find a proper disposal area that appropriate with regional spatial planning and fulfill with the regional strain criteria, elimination strain criteria and social criteria. The disposal election proses consist of 3 phase of strain that is regional strain phase, elimination strain phase and determination phase. This evaluation use 2 methode that is Le Grand methode and SK SNI T 11-1991-03. The result of this study find an appropriate disposal area in Desa Surajaya of Kecamatan Pemalang which Le Grand grade is very good area and this area are almost definite acceptable and SK SNI grade is 532 that is an appropriate area for final disposal.

Keywords : area, final disposal, Le Grand, SK SNI, Kabupaten Pemalang

OPTIMALISASI TEMPAT PEMBUANGAN AKHIR (TPA) RAWA KUCING KOTA TANGERANG

Deni Nuryadi, Ika Bagus Priyambada, Sri Sumiyati

ABSTRACT

Waste are still considered as problems for cities in Indonesia. The lack of appropriate land as landfill location and waste volume that increase linierly with people and economic growth are the factor. Without appropriate treatment, landfill can be dangerous for environment. Sanitary landfill system are the most effective method to reduce negative effect toward environment. Tangerang City landfill that located at Rawa Kucing wide are 13 hectare, but nowadays only 1.5 hectare remains. Beside that, Open dumping used as basic operation at Rawa Kucing landfill, although there are several zone that start to apply controlled landfill. Open dumping method very potential to cause environmental pollution. To increase capacity and reduce environmental impact, it is needed to apply landfill optimalization using sanitary landfill. The goal of this study are to give alternative waste treatment optimalization method using sanitary landfill design, repair and improve facilities so Rawa Kucing landfill can be more effective and optimal.

Key Word : *landfill, optimalization, sanitary landfill*

STUDI EVALUASI DAN OPTIMASI TPA BANYU URIP KOTA MAGELANG

Arief Rahman

Ir. Syafrudin, CES. MT

Wiharyanto Oktiawan, ST. MT.

ABSTRACT

As like another town in Indonesia, Magelang also use landfill as a burrying place of solid waste/ rubbish. The landfill that serviced Magelang is placed in Desa Banyu Urip Kabupaten Magelang with it area wide is 5,4 hectare. The landfill consist of five burrying zone and at this momen only left one zone that still can be used. That being a major problem in that solid waste management is availablity of area to burrying solid waste in TPA Banyu Urip is decrease and there is not yet a new alternative area that can be used for landfill location so that Magelang threattended not have an area to burrying its waste. Beside that, solid waste management in that landfill not yet complete the environmental quality standar and still operated with open dumping system. The aim of this study is to evaluate TPA Banyu Urip and give some alternative to optimize the landfill by changing the burrying methode with sanitary lanfill methode, repair and added infrastructure that not yet available so TPA Banyu Urip can be used more efectively dan more optimize.

Base on proper value of SK SNI T-11-1991-03, 1991 can be conclude that TPA Banyu Urip is decent with environmental checking (value 493). Beside that, from accomplishment of this study it is obtained an optimization alternative of TPA Banyu Urip with redesain the site and cange the operational concept with sanitary landfill concept.

Keywords : evaluation, optimalization

COMPOSTING DESIGN AS PART OF SOLID WASTE MANAGEMENT IN MAGELANG

Yunita Endah Komalaningrum, M. Arief Budiharjo, Wiharyanto Oktiawan

Abstarct

In economically developing area such as Magelang, constraints related to economics, technology, and qualified personnel have narrowed the choice of acceptable solid waste management, treatment, and disposal options. Viable options include minimisation, recycling, composting, incineration, and sanitary landfilling. Composting especially open windrow methode is the option that, with few exceptions, best fits within the limited resources available in developing countries. A characteristic that renders composting especially suitable is its adaptability to a broad range of situations, due in part to the flexibility of its requirements. Composting is also providing solution for the need of cheaper organics fertilizer. However, home composting still can not be applied related to society's habits. Therefore this planning is aimed to desain a public composting facility. Composting would be held in Banyu Urip final disposal. With 1230 square meters wide, this facility is able to handle fresh organic waste up to 25 M3/day and produce 284,2 Ton compost/month. Production cost Rp 55,-/Kg. Compost product would be distributed in Magelang and Kabupaten Magelang.

Key Words : Composting, solid waste, open windrow, fertilizer, composting

EVALUASI DAN PENGEMBANGAN ASPEK TEKNIS OPERASIONAL PENGELOLAAN PERSAMPAHAN KABUPATEN PATI

Muhammad Zaidan Prihantoro
Ir. Syafrudin, CES, MT Ika Bagus Priyambada, ST, MEng

ABSTRACT

Pati is a regency of middle jawa. The number of residents of Pati in 2007 is 1.247.881. By resident level prediction of growth of 0,89% every years the number of Pati residents in 2023 becoming 1.437.505. By increasing of residents dan consumption level each years making garbage volume to the target area serviced increase from 607,71 m³/day in 2009 becoming 807,14 m³/day in 2023. From garbage volume above, services level in 2008is just 54%. Todays services level is lower because the lack of facilities of garbage management. Such as lack of pedestrian bins, tricycle and waggon, also greater part of containers placed in Pati district. Besides age of vehicles was more than 10 years so that required more intensive service to prevent engine troubles. The result is limited services level to 8 districts dan still 13 unserved districts. By that, one of aim of this study is developed planninng management of technical operation aspect until 2023. The target of project planning, level services is becoming 95,39%. On the other word garbage volume can be managed 769,95 m³/day. To reach the target goal required technical operation development aspect, such as saving, collecting, transferring, transporting, and final dumping

Keyword : garbage volume, technical operation aspect

**EVALUASI DAN STUDI KELAYAKAN SISTEM PENGELOLAAN
PERSAMPAHAN KOTA SURAKARTA
DI TINJAU DARI ASPEK PEMBIAYAAN**

MARIA INDRAWATI. T

ABSTRACT

Surakarta is one of the big city in Indonesia that has great amount of communities about 553.411 people. Automaticly, that condition produces a lot of solid waste source served by solid waste treatment mangement in Surakarta regency increase budgetetering in economy aspect. The budgetetering that should count to manage solid waste treatment are operational and maintenance payment of solid waste treatment instrumentals and retribution cost from residences to manage their solid waste produced. The high budgetetering quantity that is spent by Surakarta's government as a management of solid waste treatment team is caused by application of 3R principles not has been done. To develop the management of solid waste treatment system of Surakarta municipal includes total invesment cost, operational and maintenance payment to count how much principle retribution value that Surakarta's people served by management of solid waste treatment team should pay. According to existing budgetetering, we can find to account payment of operational in solid waste treatment management at 2007 it is Rp. 8.698.669.350,00 of operational cost with Rp. 2.310.372.000,00 of retribution income. It means 26,56 % of operational in solid waste treatment management cost. That conditional still present under of standard so that is efforted to find 60-80% of solid waste treatment management cost from retribution of people served. The accounting result of solid waste treatment management operational in 2007 is Rp. 30.135.074.520,00 with principle retribution value is Rp 3.294/month that people served is paid.

Keyword : the solid waste treatment management budgetetering, budgetetering component, retribution

**STUDI PEMILIHAN LOKASI (*SITE SELECTION*)
TEMPAT PEMBUANGAN AKHIR (TPA) SAMPAH
(STUDI KASUS : KOTA MANNA BENGKULU SELATAN)**

Defi Ermayendri
Ir. Syafrudin, CES, MT Ir. Winardi Dwi Nugraha, MSi

ABSTRACT

The primary objective of municipal dumps was to reduce the risks to public health by requiring adequate daily cover of the solid waste deposited in landfills. To reduce risks and keep environment quality, landfill must be place in right site location and need to designed and built and operated well. The factor which do not less important is look for good land so that can minimize negative impact which generated study of site selection solid waste landfill aim to look for right area so that the location of new landfill suitable to regional planology plan and fulfill criteria screening of regional, elimination, and social. Areas of study are Kota Manna. Problems in existing landfill of Kota Manna are waste was burned at these open dumps to reduce the volume and inappropriate situation of Plano logy plan. Processes of site selection solid waste landfill consist of 3 steps: regional screening step, elimination screening step, and final step. Scoring by Le Grand and SNI 03-3241-1994 parameter. A result of this study is the location which has lowest score in Le Grand and highest score in SNI 03-3241-1994. The location in Gelumbang, Kota Manna Sub District with Le Grand score (7) that is excellent land class and SNI 03-3241-1994 score (539), include competent class zone for solid waste landfill with environmental management.

**STUDI KOMPOSTING SAMPAH DAUN DENGAN PENAMBAHAN
KOTORAN SAPI, JERAMI, TETES TEBU DENGAN STARTER EM 4
(STUDI KASUS PUSDIKLAT MIGAS CEPU)**

Karnadi, Badrus Zaman, Sri Sumiyati

ABSTRACT

PUSDIKLAT Migas Cepu is government company that have a large area with induce a lot of organic garbage / waste. Specially appear from three leaf, and grass. Become other our complex problem that produce about 8 m³ per day

Three leaf waste used as compost that are alternative in cycle of three leaf waste. compost can be use for decreaseing waste accumulation at the TPA. It's also give economic value.

In the making of compost using aerobic method, is composting process that use oxygen. For accelerate process can be use starter EM4. Utilization of three leaf waste research as compost of cow shit with variation : 1:1,3:1,5:1 and using mix of straw with variation : 1:1, 3:1, 5:1.

Result of research show that variation to make there compost as congruent in physically and chemistry be based on SNL no19-7030-2004 about compost specification of domestic organic waste and a few of book as Soetopo (1997), and Wahyono (2003). C (Carbon), N (Nitrogen), P (Phosphor), K (Kalium)the best produce by variation 5 : 1 cow waste by ingredien C-Organik 22,113%, N-Total 2,206%, C/N Ratio 10,024, P-Total 0,106%, K-Total 2,974 %.

Key word : three leaf waste, Compost, C-Organic, N-Total, K-Total

EVALUASI DAN PENINGKATAN TEKNIK OPERASIONAL PERSAMPAHAN KOTA SURAKARTA

Mirian J M¹; Widiarto^{*}; Syafrudin^{*}

ABSTRACT

The increasing number of population and activities in Surakarta increases the number of solid waste generated which in turn, will complicate its environmental problem. Therefore, program implementation in aspect of operational engineering in solid waste management must be carried out at optimum rate to match the rate of city development in order to increase the city's environmental quality. Currently, Dinas Kebersihan dan Pertamanan (Governmental Agency of Sanitation and City Park) cooperating with private agencies and the city communities is in charge of Surakarta's problem of solid waste. In 2006, the volume of solid waste generated was 1,393.561 m³/day. This study aims to evaluate the current state in Surakarta's solid waste management and then to plan its solid waste management system in the aspect of operational engineering. This study was carried out by methods of data collection, surveys, observations, and interviews to learn about the Surakarta's policy of development, the actual condition of the city's solid waste management, ideas and aspirations from all the stakeholders Domestic solid wastes are collected from the road in solid waste carts and three-wheeled motorcycle. The wastes are then transported to the landfill in dump trucks and arm roll trucks. Solid wastes in office buildings and markets are collected in containers and then are transported to the landfill in arm roll trucks.

Keywords: Solid waste management, solid waste generation, and operational engineering

**STUDI ASPEK RETRIBUSI, KELEMBAGAAN, HUKUM DAN PERAN SERTA MASYARAKAT DALAM
PENGELOLAAN PERSAMPAHAN
BERBASIS MASYARAKAT
(STUDI KASUS KELURAHAN KROBOKAN KECAMATAN SEMARANG BARAT)**

Sandra Novrika; M. Arief Budihardjo; Sri Suryoko

ABSTRACT

Population growth and community life pattern change have been increased the amount of solid waste. A good solid waste management has to be done close to the source. Krobokan, as one of village in Semarang Barat subdistrict needs an optimum solid waste management planning to minimize the amount of solid waste which goes out of the village. Community base solid waste management system can be used to solve the problem. Retribution tariff planning submits to crossed subsidy concept which basic retribution tariff burdened equal to 20% on household subject, 70% on commercial subject and 10% on social subject. At this moment, there is no solid waste organization in Krobokan. Based on community social situation and condition, there are number of housewives who are generally unwork and active in PKK, so that solid waste management organization is planned to involve PKK in order to encourage the solid waste separation. An agreement between the village institution and RT/RW as community representative that has contents of solid waste management implementation guideline, especially about operational implementation of solid waste management in field and solid waste retribution has to be arranged. Community participation in solid waste management can be raised by elucidation and training from Dinas Kebersihan and LSM.

Key words : solid waste management, retribution, organizational, law, community participation

**RENCANA SISTEM PENGELOLAAN SAMPAH KOTA TEGAL BERDASARKAN
RENCANA PENGELOLAAN SAMPAH SKALA REGIONAL WILAYAH BREBES**

TEGAL SLAWI

Yuli Prasetyanti

ABSTRACT

Tegal as a municipal is one of autonomy area in Central Jawa Province that has 39,68 km² spaces and 245.234 people. (statistic data, 2004). They produce solid waste about 733,24 m³ per day in average. Based on it, the solid waste transported to Landfill is 491,27 m³/day. Location of Tegal in lowland and it bounded with North Sea make specific problem to find area for proper landfill location. Up to now, Tegal uses landfill area rented from people's. It also causes problem in developing of solid waste treatment in that area. Another problem is limit budget of solid waste management. The fund retribution from Tegal's people to cost their solid waste management is too less than budget needed. So almost of the budget is held responsible by the government. With The Regional Planning of Solid Waste Management Included Brebes Tegal Slawi Area, can make design of solid waste management in municipal or regency in the next time, respectively. It's design could consider of many aspects. They are institutions, operational technics, budgeting and fund retribution, law and people concerning so that can lead optimum of the solid waste management in municipal respectively, especially Tegal.

Key words: solid waste management, planning, regional

**EVALUASI DAN OPTIMALISASI KINERJA
INSTALASI PENGOLAHAN LUMPUR TINJA (IPLT)
KOTA PAYAKUMBUH**

Fauziah Rahmi

Ir. Mochtar Hadiwidodo dan Nurandani Hardyanti, ST, MT

**STUDI PEMILIHAN LOKASI (SITE SELECTION)
TEMPAT PEMBUANGAN AKHIR (TPA) SAMPAH REGIONAL**
(STUDI KASUS : KOTA PEKALONGAN, KABUPATEN PEKALONGAN,
DAN KABUPATEN BATANG)

Setyowati, Syafrudin, Wiharyanto Oktawan*)

ABSTRACT

Mostly waste disposal activity causing environmental quality decrease, both abiotic and biotic components, give bad impact for human and his environment. To reduce bad impact and keep environment quality, landfill must be place in right site location and need to designed and built and operated well. The important factor which do not less important is look for good land so that can minimize negative impact which generated.

Study of site selection solid waste regional landfill aim to look for right area so that the location of new landfill suitable to regional planology plan and fulfill criterion screening of regional, elimination, and social. Area of study are Pekalongan Town, district of Pekalongan, and district of Batang Problems in existing landfill are landfill of Pekalongan Town and District of Pekalongan capacities have overload and closing District of Batang Landfill 5 years later.

Process of site selection solid waste landfill consist of 3 steps : regional step, elimination step, and final step. Scoring by parameter Le Grand and SNI 03-3241-1994. Results of this study is the location which has lowest score in Le Grand and highest score in SNI 03-3241-1994. The location in Batusari-Sengare, Talun, District of Pekalongan with Le Grand skor (11) that is very good land class and SNI 03-3241-1994 score (435), include competent class zona for solid waste landfill.

Keywords : *Site Selection, Regional Solid Waste Landfill, Pekalongan Town, District of Pekalongan, District of Batang, Le Grand and SNI 03-3241-1994.*

PERENCANAAN PENGELOLAAN SAMPAH TERPADU KAWASAN KECAMATAN GAYAMSARI

Winardi Dwi Nugraha^{*)}, Ika Bagus Priyambada^{*)}, Yuli Widiyanto

ABSTRACT

Management paradigm of solid waste with gathering, transportation and disposal system is time to replace with new paradigm. The compact solid waste management system is approximation system which reasonable as solution of solid waste problem. The compact solid waste management is a systematic activity, completely, and connected overwhelm subtraction and solid waste handled (in Act number 18 about Solid Waste Management, 2008). Solid waste management in Gayamsari district there is at the moment to lean still at long pattern, that is solid waste at gather from the source, transpot to temporary receiver at residence, and discard to final disposal at residence. Solid waste which produced when not handled with well will to cause environment pollution, disturb beauty and dangered peple healty. The concept of compact solid waste management execute with doing maximaly solid waste reduction with solid waste manner in the nearest location of solid waste source, with approximation of law an regulation aspect, organization and institution aspect, operational technic aspect, expenditured and retribution aspect, also the society active people aspect.

Key word : Solid waste, regulation, organization, operational technic, cost, society aspect

OPTIMASI SISTEM PENGUMPULAN DAN PENGANGKUTAN SAMPAH DENGAN MENGGUNAKAN PROGRAM DINAMIS POWERSIM (Studi Kasus: Kabupaten Pati)

Elia Sawitri, M. Arief Budihardjo, Badrus Zaman^{*)}

ABSTRACT

Solid waste has become one of the problems that will never be apart from society. The increase of the population and people's activities increase the volume of the solid waste produced. If the amount and the condition of waste transport vehicles aren't sufficient to transport waste, there will be piles of solid waste. The number of solid waste produced by Pati Regency that serve in Sukoharjo landfill is $844.678 \text{ m}^3/\text{day}$. Simulation of Powersim v.25 model showed that there are some condition of collecting and transported waste make waste residue because, waste volume that can carry in to the landfill only $200 \text{ m}^3/\text{day}$, although the number of waste that can't be carry in to the landfill is $644.678 \text{ m}^3/\text{day}$. There is optimally ritation in collecting aspect with community participation to collect the waste can minimalist amount of waste that can't be carried. In transported aspect, planned repairs dump truck and arm roll truck and the optimally ritation. The recommended collection system improvement an 2008 are 46 unit solid waste pedicab, with 0.85 m^3 capacity of twice/day rotation, 14 units of solid waste pedicab of once/day rotation, and 55% of solid waste is directly discharged to the TPS by the people. The recommended transportation system improvement on 2008 are 1 unit of arm roll with 7 m^3 capacity of 4 times/day rotation, 2 units of arm roll with 7 m^3 capacity of 5 times/day rotation, 1 unit of arm roll with 7 m^3 capacity of 6 times/day rotation, 3 units of dump truck with 7 m^3 capacity of twice/day ritation, , and 1 unit of dump truk with 10 m^3 capacity of twice/day rotation.

Key words: Collecting, Powersim, Solid Waste, Transporting.

**STUDI PENGEMBANGAN TEKNIS
TPA JERUKLEGI KOTA CILACAP JAWA TENGAH
DENGAN SISTEM SANITARY LANDFILL**

Laksminarastri Widyakristi, Syafrudin, Irawan Wisnu Wardana

ABSTRACT

As another town in Indonesia, Cilacap also use landfill as a final disposal of solid waste/ rubbish. Administrative Town of Cilacap open dumps refuse to Jeruklegi final disposal with minimum handling of leachate, methane gas, and other bad effects polluting the environment. Jeruklegi final disposal start its operation as an open dumping landfill system since 1986. The increasing population, and Gross Regional Domestic Product of Cilacap city will generally increased the amount of refuse and also will actually shortened the operational time of the Jeruklegi final disposal. To increase the amount capacity of the Jeruklegi final disposal, it is necessary to expand the existing area and redesign it with sanitary landfill method to reduce environmental risks. The purpose of this study is to design technical development of sanitary landfill final disposal in Jeruklegi final disposal which can accommodate all kinds of proper refuse treatment activities. The results of this study is a new sanitary landfill final disposal design with leachate collection system, gas venting device, other supporting facilities, including truck scales, and also additional heavy equipment requirements. The expense budget to built this Jeruklegi sanitary landfill design is approximately Rp 7.784.086.500,90

Keywords : design, Jeruklegi, landfill, sanitary, Cilacap

**PERENCANAAN SISTEM PENGELOLAAN SAMPAH TERPADU
KAWASAN PASAR
(Studi Kasus Pada Kawasan Pasar Johar Semarang)**

*Effendi ; Winardi D.N *) ; Irawan Wisnu Wardana *)*

ABSTRACT

In Indonesia Act number 18/2008 About Solid waste Management explaining that every people have obligation to treat and good handle their household solid waste properly and other solid waste some kind household solid waste environment. Integrated Solid waste Management concept is solid waste treatment by maximizing solid waste reduction, solid waste reduce as near as possible from sources. Treatment area could be in Temporary solid waste upsite, transfer station and other place around the sources area. Johar market area is the first pilot project in Semarang city. At Johar market, solid waste treatment is managed by local authority who make into cooperation which is Koperasi Karsa Bersama which conduction from UPKPS or unit of cleaning management markets in Semarang. Johar market solid waste treatment will apply integrated treatment concept which have many approach including law aspect, institution aspect, technique operational aspect, retribution aspect and social support aspect.

Keywords : management, integrated, solid waste, market

DESAIN PENGOMPOSAN TPA TRITIH LOR KABUPATEN CILACAP

Alwin Gustin A ; Wiharyanto Oktiawan^{*)}; Badrus Zaman^{*)}

ABSTRACT

At this moment, garbage management in many cities in Indonesia is only transporting the garbage from their sources to the solid waste landfill without existence of furthermore processing which can lessen the danger which possible can be happened. Therefore, one of the correct processing method is recycle by composting, because 50 - 80 % city garbage represent the organic garbage that can be composted. Besides useful to lessen the amount arise the organic garbage, composting also give the advantage to all farmer, as well as assigning value economic for organic garbage. Cilacap City, that have density of population have composition of organic garbage of 81,18 % from the garbage entering the landfill, or equal to 130,32 m³/day. From arising the organic garbage, the land requirement for the composting facility is equal to 1,85 Ha with the compost production is 37,75 ton/day. Compost fasility in TPA Tritih Lor consisted of garbage input site, activated compost site, filtering site, storage and offices. the acceptance space, active compost space, space pengayakan, warehouse, and office. The cost needed to make this composting facility were Rp. 3.296.367.755,74

Key word : organic garbage, open dumping, TPA Tritih Lor, composting.

**STUDI PENGARUH PENCAMPURAN SAMPAH ORGANIK
DENGAN AKTIVATOR SAMPAH**

(Studi Kasus TPA Sukoharjo Pati)

Ardiana Vita R¹, Ir. Endro Sutrisno, MS², M. Arief Budihardjo³

OPTIMASI SISTEM PENGUMPULAN DAN PENGANGKUTAN SAMPAH KOTA CILACAP DENGAN MODEL DINAMIS POWERSIM

Art Hapsari^{*)}, Badrus Zaman, Arief Budihardjo^{**)}

ABSTRACT

Collecting and transporting waste are waste management problems on Cilacap, thus optimalization and efficiency of waste collecting and transporting management needed to increase service community. Powersim is one of many dynamic system software programs by using models to simulate the actual situation. Simulation of the Cilacap's solid waste collection and transportation model are shown by interaction and an interlink connection between the number of armada, rotation and its operation time. With the analysis a connection of cause and effect between elements which took part on waste problems. The problems structure could be understood more and by the understanding of the structure the cause and effect of the element on waste management would be understood clearly. Next, regulation could be formulate, simulate and predicted the effect. TPS which located at Cilacap will be used as a container site, because it was planned to replace the TPS tub with a container. Optimization is planned to be started at 2008 until 2027 with the percentage of solid waste served at the year 2008 is 60%. Simulation of Cilacap's solid waste optimization compose of waste collecting without recycling concept, waste collecting with recycling concept, waste transportation without recycling concept dan waste transportation with recycling concept. The optimization for each waste collection at Cilacap are by using a waste wagon armada that rotates every day by involving the society on waste collection and also rotation optimization. While for the waste transportation, the optimization is to be replace with an armroll armada, thus, to finish off the age of the dump truck through the year of 2013.

Key words :Cilacap, Collecting, Powersim, Transporting, Solid Waste

**PERENCANAAN ASPEK TEKNIK OPERASIONAL
SISTEM PENGELOLAAN PERSAMPAHAN REGIONAL
(Studi Kasus : Regional Kota Pekalongan, Kabupaten Pekalongan,
dan Kabupaten Batang)**

Febi Rasita Putri, Ika Bagus Priyambada^{*)}, M. Arief Budihardjo^{*)}

ABSTRACT

Solid waste has become one of the problems that will never be apart from society. As the population and the peoples activity goes higher, the amount of solid waste produced will also increased. Pekalongan City, Pekalongan District and Batang District were a region with a vast population. The number of solid waste produced by Pekalongan is 762,22 m³/day, Pekalongan District by 2.114,63 m³/day, and Batang District by 1.267,81 m³/day. With its large numbers of solid waste produced, each area needed a vast landfill site. Since each of the landfill in the area are almost worn out, Pekalongan doesn't have any new site for a new landfill, and to minimize the number of landfill, cooperation between each area has been established by designing a construction of a regional landfill for the three area. To support the design the new regional landfill and to support the solid waste management at Pekalongan, Pekalongan District and Batang District a fine Solid Waste Technical Operating Management is needed, starting from road sweeping and collecting, transportation through the final dumping. The result were shown in a technical operating aspect activity plan starting from the source of the waste until the waste transportation to landfill also the needed goods which could support solid waste management and the needed human resources for the solid waste management system at the three area to work effective and efficiently. Therefore the cleanliness and aesthetic of the three city could be kept.

Keyword : solid waste, the number of solid waste, solid waste management, regional landfill, technical operating aspect

REGIONALISASI SISTEM PENGELOLAAN PERSAMPAHAN
(Studi Kasus : Kota Pekalongan, Kabupaten Pekalongan,
dan Kabupaten Batang)

IKE YUNIA WINASTUTI

Ika Bagus Priyambada, ST, MEng

Ir. Winardi Dwi Nugraha, MSi

ABSTRACT

The problems happened in solid waste management have been through by the cities and districts of Indonesia. Pekalongan City, Pekalongan District, and Batang District have the same problems, its about landfill site. The worn out of landfill site, limited area to be a new site become the problems for them. The position that is in one region become one of the reason to get cooperation for a new regional landfill site. A new regional landfill site is placed on Talun, Pekalongan District. This cooperation needs a fine organization system to support all the aspects. In this plan, there is SWOT analysis to get a regional organization cooperation system and also analysis about solid waste organization in each area. Beside that, to support the planning of technical operating aspect, there is an analysis for solid waste operating financial in each area. This financial analysis is started from the invest of goods cost, the operating cost starting from collecting until final dumping, the perating cost of each source, and also the retribution for society. By this plan, its expected can make the solid waste management system in each area get stronger.

Keyword : *solid waste, the number of solid waste, Regional landfill, organization, operating cost, retribution*

**STUDI POTENSI NILAI EKONOMI SAMPAH ANORGANIK DAN
KONSEP DAUR ULANG PENGELOLAAN SAMPAH PERKOTAAN
(Studi Kasus : Kota Cilacap)**

Wenny Pasma Sari , Ika Bagus Priyambada, ST.MEng. , M. Arief BudihardjoST.MEng.Sc^{*)}

**STUDI PEMILIHAN LOKASI (*SITE SELECTION*)
TEMPAT PEMBUANGAN AKHIR (TPA) SAMPAH KOTA JUWANA KABUPATEN
PATI JAWA TENGAH**

Herlan Sugianto
Ika Bagus Priyambada, ST, MEng

Sri Sumiyati, ST, MSi

ABSTRACT

Mostly waste disposal activity causing environmental quality decrease, both abiotic and biotic components, give bad impact for human and his environment. To reduce bad impact and keep environment quality, landfill must be place in right site location and need to designed and built and operated well. The important factor which do not less important is look for good land so that can minimize negative impact which generated.

Study of site selection solid waste regional landfill aim to look for right area so that the location of new landfill suitable to regional planology plan and fulfill criterion screening of regional, elimination, and social. Area of study are district of Juwana.

Process of site selection solid waste landfill consist of 3 steps : regional step, elimination step, and final step. Scoring by parameter Le Grand and SNI 03-3241-1994. Results of this study is the location which has lowest score in Le Grand and highest score in SNI 03-3241-1994. The location in Pucakwangi, District of Juwana with Le Grand skor (14) that is very good land class and SNI 03-3241-1994 score (501), include competent class zona for solid waste landfill.

Keywords : *Site Selection, Regional Solid Waste Landfill, District Juwana, Le Grand and SNI 03-3241-1994.*

DESAIN PENGOMPOSAN TPA SELOMERTO KABUPATEN WONOSOBO

Dewi Novianti ; Ika Bagus Priyambada^{*)}; M. Arief Budiharjo^{*)}

ABSTRACT

Midden of city is predicted will be increase five times in 2020. The more increase of garbage volume is the lower priode of TPA usage. Therefore, one of suitable management is to recycle by composting because 50-80 % of city garbage is an organic hence it could be composted. Besides it is useful to decrease the amount of the the coming forth of organic garbage, composting makes self benefits among farmers, and also it gives economical value for organic garbage. Wonosobo as a large population city has organic garbage composition of 82,6 % from the city garbage which comes to the TPA of Selomerto or it raises 149,7 m³/day. From the coming forth of organic garbage, hence it gets area needs for composting facilities of 1,27 Ha with compost production of 2,405 Ton/day. Compost facilitiy in Selomerto TPA consists of receipt area, active compost area, sieving area, storage and office. The cost ti devlope compost facility is Rp Rp. 2.825.657.811.35

Key words : Organic Garbage, TPA of Selomerto, Composting

**DESAIN PENGOMPOSAN DALAM PENGELOLAAN SAMPAH
KOTA SURAKARTA
(Studi Kasus : TPA Putri Cempo – Mojosongo)**

Andi Sahputra ; Badrus Zaman^{*)}; Wiharyanto Oktiawan^{*)}

ABSTRACT

*Garbage management system in many cities in Indonesia is only transporting the garbage from their sources to the solid waste landfill without existence of furthermore processing which can lessen the danger which possible can be happened. Therefore, one of the correct processing method is recycle by composting, because 50 - 80 % city garbage represent the organic garbage that can be composted. Besides useful to lessen the amount arise the organic garbage, composting also give the advantage to all farmer, as well as assigning value economic for organic garbage. Surakarta City, that have density of population have composition of organic garbage of 68,7 % from the garbage entering the landfill, or equal to 828,57 m³/day. From arising the organic garbage, the land requirement for the composting facility is equal to 1,47 Ha with the compost production is 51,43 ton/day. Compost facility in TPA Putri Cempo consisted of garbage input site, activated compost site, filtering site, storage and offices.. The cost needed to make this composting facility were Rp. **6.924.770.893,41***

Keywords : composting, open dumping, organic garbage, TPA Putri Cempo.

STUDI POTENSI NILAI EKONOMI DAUR ULANG SAMPAH KERTAS KOTA SALATIGA

Rendra Widyanto, M. Arief Budihardjo, Sri Sumiyati *)

ABSTRACT

Waste management of Salatiga can be optimized with recycle concept application. At this time, inorganic waste recycling done by pickers. In 2008, waste composition of Salatiga consist of 69,89% organic waste and 30,11% inorganic waste, where paper garbage composition equal to 9,35%. This garbage composition designate Town of Salatiga have potency to recycle paper garbage. Concept recycle this can walk optimally if separate of paper waste in source. Paper waste have economic potency value directly and indirectly. economic potency value directly equal to Rp 4.446.975,00/ day. while economic potency value directly in the form of decreasing cost of operational equal to Rp 28.800.000 / year. It got advantage with paper garbage recycle equal to Rp 72.000.000 / day. with existence of concept recycle paper garbage can reduce garbage which step into TPA Ngronggo equal to 6.51% / day.

Key words : *Paper waste, potency economy, recycle*

**STUDI POTENSI REDUKSI SAMPAH MELALUI KOMPOSTING DAN DAUR ULANG
DI KECAMATAN JEBRES KOTA SURAKARTA
(Studi Kasus : Kecamatan Jebres Kota Surakarta)**

Rosiana Indrawati , Ika Bagus Priyambada, Badrus Zaman^{*)}

ABSTRACT

Pada tahun 2008, komposisi sampah Kecamatan Jebres adalah 63,01 % sampah organik dan 36,99 % sampah anorganik. Pengelolaan persampahan Kecamatan Jebres bisa dioptimalkan dengan penerapan konsep daur ulang dan komposting untuk mengurangi timbulan sampah Kecamatan Jebres. Pada tahun 2008, sampah yang dihasilkan adalah 323,914 m³/hari dan pada tahun 2027 meningkat menjadi 594,978 m³/hari. Penerapan daur ulang dan komposting dapat mengurangi jumlah timbulan yang masuk ke TPA. Dalam konsep reduksi sampah dengan komposting dan daur ulang ini pada awal perencanaan tahun 2008 dapat mengurangi volume sampah yang dibuang ke TPA dari 153,167 m³/hari menjadi 62,802 m³/hari. Di sisi lain, pelaksanaan daur ulang dan komposting memiliki potensi ekonomi yang cukup besar. Pada tahun 2008 potensi ekonomi sampah Kecamatan Jebres adalah Rp. 31.859.313,00 per hari dan pada tahun 2027 meningkat menjadi Rp. 172.216.270,00 per hari. Selain itu konsep daur ulang komposting ini juga bisa membuka lapangan pekerjaan bagi pemulung dan pengangguran. Dimana kebutuhan pekerja untuk pelaksanaan konsep ini mencapai 265 pekerja pada tahun 2008 dan meningkat menjadi 816 pekerja pada tahun 2027.

Key words : Daur Ulang, Komposting, Sampah Anorganik, Sampah Organik

**OPTIMALISASI
INSTALASI PENGOLAHAN LUMPUR TINJA TEMUREJO
KABUPATEN BLORA**

Andhika P.N ; Wiharyanto O ; Sri Sumiyati.

ABSTRACT

Regency of Blora is one of regens which is located in Central Java with 844.490 population and 1.820,59 km² area wide, which is consist of 18 subdistricts. In order to increase its public health, it was constructed a septage treatment plant (IPLT). The worse of IPLT management system cause IPLT does not work optimize. The discharged capacity reaches 8 m³ /day but only 1,25 m³/day septage is processed. In order to increase IPLT effectiveness, evaluation and optimization need to be done which is concerning 5 IPLT management aspect. The mentioned five aspects are inkudes institution, financial, legal, operational and technical, and also social aspect. With evaluation concerning to those aspects it is expected that the optimization IPLT management system and process will be occurred. The evaluation result shows that IPLT of Blora needs to expand its service area, make regulation about IPLT management, explicit distribution of duty and responsobility and also addition and repair IPLT mangement and operational infrastructure to optimize its work and function

Key word : Septage, Optimization

OPTIMALISASI INSTALASI PENGOLAHAN LUMPUR TINJA (IPLT) KABUPATEN DEMAK

Ariasti Hana Savitri ¹⁾, Wiharyanto Oktiawan ²⁾, Sri Sumiyati ²⁾

ABSTRACT

Demak as one of Sub Province in Central Java with 1.043.111 populations (in year 2006) and 89.743 Ha area wide which is consist of 14 subdistricts. In order to handled and treat septage from septic tank in Demak regency, Septage Treatment Plant (IPLT) Kalikondang was build with stabilitation ponds system. IPLT Kalikondang occupied $\pm 280 \text{ m}^2$ wide area and located with land disposal. Less attention by the management (Kimpraswil Boards) in septage treatment cause IPLT can't works optimum. The discharged capacity reaches $2,5 \text{ m}^3/\text{day}$ but only $1 \text{ m}^3/\text{day}$ septage was in into IPLT. TS, BOD, COD and Total Coli consentration which trends increase in stabilitation ponds that indicate the septage proccess doesn't work well. In order to increase IPLT effectivity, evaluation and optimalization need to be done which is concerning 5 IPLT management aspect include institution, social aspect, legal, technical and operational, and also financial. The evaluation result concerning to IPLT Kalikondang management system, it needs to restricted its service area, refresh the regulation, increase interest, duty and responsobility of the management, increase and repair infrastructures in order to support IPLT operational and maintenance to optimize its works and functions.

Key word : Septage, IPLT, Management System, Optimalization

REDESAIN TPA NGRONGGO KOTA SALATIGA DENGAN METODE SANITARY LANDFILL

Daris Sugiarto, Ika Bagus P, Nurandani H

ABSTRACT

Ngronggo final disposal is operated since 1994. It is operated by open dumping method which have minimum leachate controlling, minimum methane controlling and negative effect for environmental. It is not suitable with RI regulation no 18/2008 about solid waste management which explain that a final disposal have to process and return solid waste to the environmental safely. Ngronggo final disposal is redesigned to reduce negative effects for environmental. Ngronggo final disposal is redesigned by sanitary landfill method. The purpose of this study is to design developing technique of final disposal with sanitary landfill method on the Ngronggo final disposal to accommodate all kinds of proper refuse treatment activities. The results of this study is a new sanitary landfill final disposal design with leachate collection system, gas venting device, other supporting facilities, including trucks scales and also additional heavy equipment requirements. The expense budget to built this Ngronggo sanitary landfill design is approximately RP. 12.436.892.773,32

Keywords : design sanitary landfill, Ngronggo, Salatiga

PERENCANAAN PENGELOLAAN PERSAMPAHAN DI KECAMATAN BAKI DAN KECAMATAN POLOKARTO KABUPATEN SUKOHARJO

Eki Fajari Dasita

Ika Bagus Priyambada, ST, MEng

Ir. Irawan Wisnu Ardhana, MS

ABSTRACT

Existance of garbage is still regarded unusefull thing now. The problem that always come out from managing of garbage in big city is increasing of population and PDRB, so amount of garbage is coming out from home and factory will be increase. The condition of garbage handling in Sukoharjo regency has not been optimal if it's looked from service area. It can be seen in the service area that only reach 58% from total area in Sukoharjo Regency. From 12 Subdistricts in Sukoharjo Regency, only seven Subdistricts that have been served their garbage (Subdin KP DPU Kab. Sukoharjo). Because of the condition, it's needed planning for garbage managing system in area that hasn't been served and in area has high potention produces garbage. One of aspect garbage managing is operational aspect. The aspect is important, because it has relation with placing, collecting, removing, and carring to the last place for garbage. By this program, hoped the area service of garbage managing in Sukoharjo Regency will be better and can be practiced 3 R.

Keyword : Handling garbage, planning

PERENCANAAN SISTEM PENGELOLAAN SAMPAH TERPADU KECAMATAN SIDOMUKTI KOTA SALATIGA

Irawan Wisnu Wardhana^{*)}, Ika Bagus Priyambada^{*)}, Endar Rohmadi

ABSTRACT

Management paradigm of solid waste with gathering, transportation and disposal system is time to replace with the new one. The compact solid waste management system is approximation system which reasonable as solution of solid waste problem. The compact solid waste management is a systematic activity, completely, and connected overwhelm subtraction and solid waste handled (in Act number 18 about Solid Waste Management, 2008). Solid waste management in Sidomukti district there is at the moment to lean still at long pattern, that is solid waste at gather from the source, transport to temporary receiver at residence, and discard to final disposal at residence. Solid waste which produced when not handled with well, will cause environment pollution, disturb beauty and dangered people healthy. The concept of compact solid waste management execute with doing maximaly solid waste reduction with solid waste manner in the nearest location of solid waste source, with approximation of law an regulation aspect, organization and institution aspect, operational technic aspect, expensitured and retribution aspect, also the society active people aspect.

Key word : Solid waste, regulation, organization, operational technic, cost, society aspect

**OPTIMALISASI
INSTALASI PENGOLAHAN LUMPUR TINJA (IPLT)
KABUPATEN KLATEN**

Wiharyanto O^{)}; Sri Sumiyati ^{*)}; Mahardiani K.*

ABSTRACT

The IPLT (Installation of Septage Treatment) in Klaten is designed to process the septage with capacity of 19m³/day. Even though IPLT has several services areas in Klaten and others in some of the sub-district outside Klaten, they only received untreated influents as much as 2m³/day. These small amounts of septage debit caused an accumulation of the mud in only one basin and also over designed in each processing basin against the piling of the mud, which does not have a good effect for the overall process. These also caused by the weaknesses of the installation treatment system which also leads to be a reason why the operational of the installation couldn't be optimized.

In order to increase the installation performance, some optimization of IPLT's management system may need to be done. Since it consists of five different aspect of management, therefore an evaluation on each aspect have to be done first. More over those aspects are aspect of institution, aspect of regulation, aspect of society sector partnership, aspect of financial and the main aspect of all of those which is operational aspect. By evaluating each aspect, the optimization step can be reach, which automatically make the performance of these installation improved. Based from the IPLT Klaten's evaluation, the developments that will be needed are: procurement of law that controls the septage processing and the obligation to drain the septic tank, and also reparation for the processing unit and other operational facilities.

Key Word : Installation of Septage Treatment, septage, management system, evaluation, optimization

STUDI POTENSI NILAI EKONOMI SAMPAH PLASTIK MELALUI KONSEP DAUR ULANG

(Studi Kasus : Kota Wonosobo)

Riznika Kurniani , M. Arief Budihardjo^{*)}, Badrus Zaman^{*)}

ABSTRACT

Plastic waste composition of Wonosobo City in the year of 2008 is 52,474% (from total of inorganic waste). This composition indicates that Wonosobo City have potency to lessen its waste by applying recycling concept and by optimizing the role of trash collector to managing plastic waste. The existing waste management condition shows that organic and inorganic wastes are not separated from its source. As a result, plastic waste (which is still economically valuable and still can be recycled) was brought to TPA. The target of this research is to find the amount of plastic waste and economic potency that can be recycled. These result continued by planning the operational technique with recycling concept (plastic waste) in Wonosobo City Waste Management. The research method in measuring volume and composition of waste is according to SNI 19-3964-1994. The result shows in year 2008, the economic potency of plastic waste without treatment (the income of trash collector) is Rp. 938.713,53 per day, the economic potency of plastic waste with crushing process is Rp. 1.717.099,29 per day, the economic potency of plastic waste with peletizing process is Rp. 3.086.554,43 per day. Beside that, by applying recycling concept of plastic waste Wonosobo City can reduce 7,02% from the total waste was brought to TPA .

Key words : Economic potency, plastic waste, recycle

**PERENCANAAN SISTEM PENGELOLAAN PERSAMPAHAN BERBASIS MASYARAKAT
DENGAN PENERAPAN 3R (*REDUCE, REUSE, RECYCLE*)
(Studi Kasus : Kelurahan Kutabanjarnegara, Kabupaten Banjarnegara)**

Sekar Aroem Wigatiningtyas*), Winardi Dwi Nugraha, Dwi Siwi Handayani)**

ABSTRACT

Kelurahan Kutabanjarnegara is one of kelurahan which located in Kabupaten Banjarnegara, Central Java. This kelurahan is center of public activity in Kabupaten Banjarnegara that consist of 10954 people and has 148.200 Ha land area which divided into 8 RW and 37 RT. From result of quesioner distribution knowable that 17.17 % from responden has not serviced by garbage collectman. Volume of solid waste up a person per day in year 2008 at Kelurahan Kutabanjarnegara from sampling result are 2,199 lt/person/day for domestic solid waste and 2,307 lt/person/day for non domestic solid waste. One of area in Kelurahan Kutabanjarnegara that has not serviced by garbage collectman is RT 04 RW 07, then will be plan community based solid waste management with 3R application (Reduce, Reuse, Recycle). Society in this area throw away their solid waste to river or one of free land member society property so has impacted disturbance of society and environment. Planning of community based solid-waste management in RT 04 RW 07 Kelurahan Kutabanjarnegara consist of some aspects these are institution, technical, financial, law and public contribution. In this plan will be examination about activities that do in planning and implementating comunity based and then will be arrange finance eslimate plan and standar operating procedure.

Keywords: *Solid waste, Community Based, 3R*

PENGOMPOSAN SAMPAH ORGANIK PERKOTAAN DAN
KOTORAN KUDA DENGAN METODE MAC DONALD MENGGUNAKAN AKTIVATOR
DARI CAMPURAN EKSTRAK SAMPAH ORGANIK DAN
KOTORAN KUDA

(Studi Kasus TPA Selomerto Kabupaten Wonosobo)

Shinta Agustina¹, Endro Sutrisno², Nurandani Hardyanti³

ABSTRACT

Unvented solid waste may contribute to various environmental problems i.e. air pollution, land pollution, and water pollution caused by leachate, composting is one of the selected alternatives of solutions to solve the solid waste problem in Wonosobo. The volume of solid waste generated in Wonosobo is 180.87 m³/day of which 149,4 m³/day is categorized as organic waste almost all of whom is able to be composted. The area of solid waste landfill in Wonosobo is 4.5 hectares. This research aims to find the optimum composition between organic waste and horse manure based on the smallest ratio C/N to study the characteristics (percentages of C, N, P, and K) of compost materials and compost products, to study the impact of horse manure addition and activator addition towards the composting process and compost products quality, to compare the quality of the compost products with the standar of SNI-19-7030-2004, and to study whether the result of this research is applicable in Selomerto landfill in Wonosobo. There are 7 variations (including 1 control variation) based on ratio of solid waste weight and horse manure weight (kg/kg) i.e. 1:1 ; 3:2 ; 2:1 ; 7:2 ; 5:1 ; 9:1 ; and 1:0. ml 80 ml of activator is added to each 7 variations. The composting method used in this research is Mac Donald method based on existing method and facilities of composting in Selomerto landfill. The research shows the fastest composting rate of 25 days is activated in 1:1 ratio variation added with 80 ml of activator. The lowest ratio of C/N (13.41) or the best composition is achieved in 5:1 ratio variation added with 80 ml of activator. All characteristics of compost (C, N, P, K, C/N ratio, temperature, pH, and moisture content) in every 7 variations of ratio have met the standard of SNI 19-7030-2004.

Keywords : *compost, organic solid waste, horse manure, activator*

EVALUASI DAN OPTIMALISASI INSTALASI PENGOLAHAN LUMPUR TINJA (IPLT) KOTA SURAKARTA

Sri Umami Parlina¹⁾, Wiharyanto Oktiawan²⁾, Winardi Dwi Nugraha³⁾

ABSTRACT

Surakarta is one of the big city that located in central java. This city has 564.920 people in 2007 and 4.404 Ha land area which divided into 5 subdistrict. To advance public health and good sanitation, Surakarta was facilitated with onsite system like septage treatment that known as IPLT. Manages capacity of IPLT is 26 m³/day. But, in fact only treat 13 m³ or 50 % from average of septage waste/ day. Beside, the effluent of wastewater still have high concentration of BOD, COD, TSS and coliform. Based on that problem, this septage treatment need to be evaluated in five managing aspect. There are technical, institution, finance, regulation and public contributon. From that evaluation then we can optimized it so that the manages capacity can optimum and increasing IPLT serve. Optimization plan in IPLT that can be used to optimize this instalation are redesign the instalation, increasing public serve, create a relationship with private sector , calculate the new retribution fee, recomended some regulation about septage disposal and regulation for under level quality to control the effluent concentration.

Keywords: *septage, BOD, COD, TSS, Coliform, optimalization*

**STUDI PENGOMPOSAN SAMPAH ORGANIK
DAN SERBUK GERGAJI KAYU SENGON MENGGUNAKAN STARTER HASIL
FERMENTASI CAMPURAN EKSTRAK RUMEN DAN TETES TEBU DENGAN SISTEM
TERTUTUP**

(Studi Kasus : TPA Mojorejo, Sukoharjo)

Yeni Kriyana W ¹⁾, Badrus Zaman ²⁾, Endro Sutrisno ²⁾

ABSTRACT

One of the problems from TPA Mojorejo Sukoharjo is the quantity of solid waste sources, particularly organic waste amounted 113 m³/day. Composting is an alternative to manage the quantity of organic waste sources. Natural composting of organic waste requires extensive time. The result of mixed fermentation of rumen extract with sugar cane drop used in organic waste composting at TPA Mojorejo Sukoharjo is fastening the decomposition process and increases the compost quality. Composting using variety of organic waste in TPA, such as the remains of vegetables, fruits, leaves and wood cutting waste. This organic waste composting using additional material as sengon wood cutting powder. In this research, compost variation comprise control variation (natural), organic waste, and the effect of mixed fermentation from rumen extract with sugar cane drop with ratio 1:1, 3:2, 5:3, and 3:1. The study result show the entire compost variation achieved the mature compost standard according SNI 19-7030-2004, low production cost and fulfill the needs of vegetation nutrition. The optimal compost variation is variation 1 contains C-organic 11,18 %, N total 0,96 %, C/N ratio 11,65 %, P total 0,88 %, K total 1,84%, pH 7,40 and temperature 26,20°C.

Key Word : compost, organic waste, rumen extract, sengon wood cutting powder, sugar cane drop.

EVALUASI KNERJA DAN OPTIMALISASI SISTEM PENGELOLAAN INSTALASI PENGOLAHAN LUMPUR TINJA (IPLT) KABUPATEN TEGAL

Adiningrum D.P¹⁾, Wiharyanto Oktiawan²⁾, Dwi Siwi Handayani³⁾

ABSTRACT

Good sanitation will be improve environmental health degree. But,in fact, good environmental health degree can't reach in Kabupaten Tegal. To increasing sanitation and healthy, Kabupaten Tegal was facilitated with septage treatment that known as IPLT.From the quantity, this instalation has the maximum capacity up to 11.53 m³/day, but in the fact this instalation only treat 4 m³/day of septage waste. From research in laboratory, the effluen of wastewater still have high concentration of BOD, COD, TSS and total coliform. Based on that problem, this instalation need to be evaluated so we can find the problem exist and take the right solution for optimalize the treatment system and the management system of IPLT Dukuhjati Kabupaten Tegal. Optimalization plan in this instalation consist of five aspec, there are technical, financial, public contribution, institution and law. The solution that can be implemented to optimalize the operation of this instalation are redesign the instalation to advance the treatment procces of wastewater, add the instalation, change the pipes, exercise for the operator of IPLT, change a new regulation based in fact, calculate the retribution fee which give good financial support for operation and maintanance of IPLT, and give knowledge to improve public contribution.

Keywords: *septage, evaluation, optimalization*

**STUDI PENAMBAHAN LARUTAN GULA DAN RAGI
TERHADAP INOKULUM
PENGOMPOSAN METODE TAKAKURA RUMAH**

Ir. Irawan Wisnu, MS, Ir Dwi Siwi H, MSi, Arya Rezagama

ABSTRACT

The Takakura Composting Method has experienced decreasing degree of the effectiveness in organic matter degradation due to several factors. The objective of the research is to know the effect of adding yeast and sugar into Takakura Inoculum. There were two control and three variation include control A (8 kg new inoculum), control B (8 kg used inoculum), Variation C (8 kg used inoculum : 75 gr sugar), Variation D (8 kg used inoculum : 20 gr yeast), Variation E (8 kg used inoculum : 20 gr yeast : 45 gr sugar). Yeast is a consortium of microorganism and sugar is a good nutrition resource for microorganism.

The measurement result showed that the adding sugar and yeast didnot affect the degradation of organic matter process and humification process. Temperature Control A was in thermophilic phase and Variation B, C, D, E used old inoculum in mesophilic phase in degradation process. The temperature got to be lower until room temperatur if it didnot be added by rice. The pH of Compost was about neutral measurement 6,4 up to 7,4. Twenty days later, physical characteristics of compost was shown. They are blacky brown in color, loose and soil smelling. Laboratory test result showed that Carbondioxide, Nitrogen, Potassium, Phospor, Water Level, Physical Condition were qualified for compost standart according to SNI no 19-7030-2004. However, these minerals content wasn't enough compared to other organic compost standards of PT. Pusri and Agriculture Departement. Takakura compost is good for ornamental plant, pot plant, fruit with the correct mixing procedure.

Key Word: Inoculum, Yeast, Sugar

PERENCANAAN SISTEM PENGELOLAAN SAMPAH TERPADU PADA KAWASAN WISATA PANTAI MARINA SEMARANG

Mega Mutiara Sari, Ika Bagus Priyambada, Johannes Hutabarat

ABSTRACT

One of the most populair tourist resort in Semarang is The Marina Coastal Area. Development of Marina Coastal Area for holiday resort will increasing the total numbers of garbage due to the visitors activity. At the moment, the garbage handling in this area is still very simple. The garbage produced was spreading on along the coastal area, there was no specific arrangement to reduce the number of garbage, it was only burned. This can produced dioxin hazard which will be harmful to the environment. To over come this problem, therefore, application of the concept integrated handling garbage toward Zero Waste will be the best solution. The integrated handling garbage concept consist of the activities to reduce, selection, gathering, reusing, distributing, and to treat with several aspect approach as follows Law Enforcement, Capacity Building, Technical Operation, Cost Benefit and Increasing The Role of Community. The concept will also can be developed to be system of integrated handling garbage.

Keywords : Integrated Handling Garbage, Law Enforcement Aspect, Capacity Building Aspect, Technical Operation Aspect, Cost Benefit Aspect, and The Role of Community Aspect.

**KAJIAN NILAI EKONOMI PENERAPAN KONSEP DAUR ULANG PADA
TPA JATIBARANG KOTA SEMARANG
STUDY ECONOMIC VALUE OF RECYCLING APPLICATION IN TPA
JATIBARANG SEMARANG**

Mya Rosie Nuraini, Dwi Siwi Handayani, Sri H. Budisulistiorini

Abstract

There is no advance structural treatment to the solid waste in Semarang city. The usage of TPA Jatibarang, landfill in Semarang City, has already exceed its limit. It can threaten the continuity of management of the solid waste in Semarang city. Therefore, the study of landfill management alternative on TPA Jatibarang is needed to longer the usage limit and maintain the operational of solid waste management in TPA Jatibarang, save the landfill area and produce economic value for both the manager and the scavenger. The composition of solid waste in TPA jatibarang are 78% wet garbage and 22% dry garbage, both kind oh garbage can be recycled so it will have high economic value. The recycle concept started with separation, continued with cutting out for each kind of dry garbage and composting for the wet garbage can produce high profit. Until the planning year of 2025, the profit is Rp 1.165.581.879.809,-. The profit not only for the manager but also fir the staff in recycling process. And for the scavenger, their income will increase if they work as the recycling staff. The income raising is from Rp. 19.000,-/person/day into Rp. 35.000,-/person/day will increase the life quality of the scavenger.

Keywords : *TPA Jatibarang, recycle, composting, economical value, scavenger*

REDESAIN TPA JATIBARANG KOTA SEMARANG DENGAN KONSEP SANITARY LANDFILL

Noor Aprilia S.D, Winardi Dwi Nugraha, Ika Bagus Priyambada

ABSTRACT

Semarang Jatibarang landfill has been operated since 1992 with the open dumping method. Until now Jatibarang landfill leachate management does not have a safe for the environment, control of methane gas and landfill control other negative impacts that are still bad. It is not in accordance with the Law of the Republic of Indonesia No.18 Year 2008 on Waste Management which explained that the landfill must be processed and return the waste to the environment is safe for humans and the environment. To reduce the harm to the environment then the landfill is designed Jatibarang again use the concept of sanitary landfill with landfill method is a method used canyon and trench method. The purpose of this study is to redesign a sanitary landfill Jatibarang landfill. The results of this study is a new design of sanitary landfill by landfill leachate channel system, a gas vent pipe, the rehabilitation of various other support facilities including truck scale, and also the addition of heavy equipment required. Costs needed to redesign the sanitary landfill landfills Jatibarang is Rp 32,947,255,000.00.

Keywords: design, sanitary landfills, the Jatibarang landfill, Semarang

PERENCANAAN TEMPAT PENGOLAHAN SAMPAH TERPADU (TPST) DI TPA JATIBARANG

Ronald Siregar, Winardi Dwi Nugraha, Sri H. Budisulistiorini

ABSTRACT

Existing management solid waste in Semarang City does not have waste processing activities with recycling concept. Open-dumping landfill system and quantity of generated solid waste still increasing worsened TPA Jatibarang condition as a final landfill site. Therefore, infrastructure and facilities is needed to support recycling operational at TPA Jatibarang. It's called TPST which contains recycling machinery such as conveyor, shredding machine, screening machine for compost and plastic palletizing machine. About 47% organic materials from waste will be composted and 12% plastics material will be processed through palletizing machine. Another material which still have economic value collected and then sells but residual material carry out to landfill site. Until 2025, 1878 m³ compost produced every day. Recycling operational process start from sortation to separate waste composition. For this purpose, all of scavenger at TPA Jatibarang will be recruited as labors.

Keyword : *TPA Jatibarang, recycling, compost, scavenger, palletizing.*

REDESAIN TPA NGEMBAK KOTA PURWODADI KABUPATEN GROBOGAN DENGAN SISTEM SANITARY LANDFILL

Sandra Mas Malinta, Wiharyanto Oktiawan , Haryono S Huboyo

ABSTRACT

Like a city in indonesia, sub Purwodadi also is using agglomeration method as waste final throwing. Waste of result in sub Purwodadi was agglomerated in TPA Ngembak with not maximal handling, so can generate negative impact to environment. Increasing population and PDRB in sub Purwodadi will increasing waste and shorting operational times in TPA. to increase TPA Ngembak capacity, so needed redesain with sanitary landfill method to decreasing envirotment risk. Intention of study is redesain TPA with sanitary landfill method at TPA Ngembak which accomodation of all activity corectly waste procces. The result of study is new design TPA sanitary landfill with leachate distribution, Air ventilation, and all of support facility. For example weighing bridge and addition of heavy equipment required. Expense of required to build TPA Ngembak design with sanitary landfill method is around Rp 8.114.910.328,28.

Key words : design, Ngembak, Sanitary landfill, TPA, Purwodadi

EVALUASI DAN OPTIMALISASI IPLT KOTA PEKALONGAN

Wina Karunia¹⁾, Irawan Wisnu Wardhana²⁾, M. Arief Budihardjo³⁾

ABSTRACT

Pekalongan is one of city located in Central Java. This city consist of 271.990 people and has 45,25 Km² land area divided into 4 kecamatan. To advance public health and clean sanitation, Pekalongan City was facilitated with septage treatment that known as IPLT, this instalation has the maximum capacity up to 39,40 m³/day, but in the real condition this instalation only treat 36 m³/day of septage waste. The effluen of wastewater still have high concentration of BOD, COD, TSS and total coliform. Based on that problem, this instalation need to be evaluated so we can find the problem exist and take the right solution for optimalizing IPLT. Optimization plan in this instalation consist of two aspect, there are technical and non tehcnical. Technical consist of service, capacity of IPLT, quantity of septage, treatment units, and facilities/basic facilities. And then, non technical consist of workers, operational system, exploiting by other institution, and financial (public contribution). The solution that can be implemented to optimize the operation of this instalation are redesign the instalation to advance the treatment procces of wastewater, expand serve area to get proper quantity of septage, create institution that concern in septage treatment, calculate the retribution fee which give good financial support for operation and maintainance of IPLT, create strict regulation about septage disposal and also has their own regulation for under level quality to control the outlet concentration.

Keywords: *septage, technical and non technical, BOD, COD, TSS, Total colly, optimization*

PEMBUATAN BIOGAS YANG OPTIMAL DENGAN VARIASI CAMPURAN KOTORAN DAN URIN SAPI

ANDHINA PUTRI HERRIYANTI
Endro Sutrisno ¹⁾, Irawan Wisnu Wardana ²⁾

ABSTRACT

The use of fuel which has led to increasing fuel prices increased dramatically.. These conditions have a major impact for low income and poor, especially in rural areas. Therefore, the current rural communities mostly have been using the new alternative energy with the use of livestock waste into biogas. The purpose of this research is to determine the optimal production of biogas with a characteristic quality of the most methane gas levels, the maximum heating value stayed the shortest time. Research carried out using two kinds of raw material variation of cow manure and cow urine. Observations include the volume of biogas, methane gas levels of quality and calorific value. The results of this study showed that in 25 days, a mixture of cow manure and cow urine in the ratio 1: 2.5 may well produce biogas, producing biogas volume of 47.56 liters, 43.7% methane gas and calorific value of 5046,257 cal/liter.

Keywords: cow manure, cow urine, biogas, methane gas levels, calorific value

DESAIN PLAMBING
GEDUNG DIKTI DEPARTEMEN PENDIDIKAN NASIONAL JAKARTA

Syahid Dwi Susanto*, Ir. Nasrullah, MS.**, Haryono S.H, ST, MT.**

***PLUMBING DESIGNS OF
THE BUILDING OF HIGHER EDUCATION DIRECTORATE
NATIONAL EDUCATION DEPARTMENT
JAKARTA***

Abstract

Health water-supply and good wastewater management had to be fulfilled for both the settlement and the office. Plumbing system of a building covers the planning of water-supply system, fire prevention hydrant-sprinkler system, drainage and vent system, and rain-water pipeline system had to be planned and designed properly.

The Building of Higher Education Directorate Jakarta is multistoried building with 19 floors and 3 basements. It has an area of 1527,37 m² each floor and a total area of 36656,79 m². Based on population density the effective area is 60-70%, and it needs 124,720 m³/day water for 3218 people. The plumbing fixtures needed was estimated of 121 water closets, 125 lavatories, 47 urinoirs, 1 shower, 244 faucets and spray (water closet), 93 holywater faucets and 261 floor drains. Water-supply sources is supplied by PDAM is reserved in the 150 m³ ground water tank. Then, it is pumped to 60 m³ roof water tank using pump which has 7,5 KW and Q=12,6 m³/hours. Pipe used is steel galvanized pipe 1,25'-5" in diameter for stacks and copper pipe 1'-1,5" in diameter for horizontal pipe.

Drainage system used separated system with horizontal pipe 1,5"-4" in diameter and stacks 3"-6" in diameter. Vent system used lup system of horizontal and stacks 1,5"-2,5" in diameter. As a building has low fire risk, sprinkler was designed by spray density 2,5m/m² in maximum work area 84m². The distance of each sprinkler head was designed 3,6 meters in the basement floor and 4.6 meters in the office. The flow of rain-water used gutter 3"-6" in diameter and leader 2,5"-5,5" in diameter. The rain water pipeline system was equipped with storm sewer which was automatically draining overflowed water into city drainage system.

Key words: Design, Plumbing, Pipe, Building, Higher Education Directorate

PERANCANGAN INSTALASI HIDRAN KEBAKARAN KERING UNTUK PROTEKSI AKTIF (STUDI KASUS : PASAR WILAYAH I JOHAR KOTA SEMARANG)

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ABSTRACT

There are two impair factor of fire extinguish. The first is fire hydrant can't give minimum flow and pressure. Second, minimum access and too many residents can't make the fire department tanker truck enter the location. The alternative to solve that problem is built a design for dry fire hydrant system. The dry fire hydrant system include of dry hydrant system and manual dry pipe system. The alternative sources for this system are raw water from Kali Semarang and process water from Semarang water supplies department. The manual dry pipe system can make water supplies more accessible, especially in high resident with limited access. In dry fire hydrant system design used active protection system. The active protection system is a first aid to fire protection before the fire department officer enters the location. The case study dry fire hydrant system design in Pasar Wilayah I Johar in Semarang City because market is a district with high level of fire risk and Pasar Wilayah I Johar is the biggest market in Semarang City. Active protection system needs support from fire protection team to operating the system in fire extinguishes. The fire protection team is working until the fire department officers enter the location.

Keywords : *Fire Hydrant, Manual Dry Pipe System, Dry Hydrant, Plumbing, Active Protection System, Pasar Wilayah I Johar*

**PERANCANGAN SISTEM PRODUKSI BERSIH
INDUSTRI KECIL TAHU
STUDI KASUS : INDUSTRI KECIL TAHU MILIK IBU SUKO, DUKUH PESALAKAN,
DESA ADIWERNA, TEGAL**

Ratna Pertiwi¹, Ika Bagus P, ST, M. Eng², Dra. Suparni Styawati Rahayu, Msi³

ABSTRACT

Soybeans industry is one of industry which many enthused by public. Besides its(the relative production process easy to be mastered, and the price reached by public, also having high nutrition makes soybeans industry growing rapidly. But, because of soybeans tradition making and very peripatetic lag technology development makes soybeans industry potence to polluting by waste water, soybeans cuticle and stinging smell. Cleaner production is proactive effort in environmental management by doing conceptual approach and operational to production process and service. So it can increase process efficiency, product, and consumption that is related to usage energy and material, and prevent or minimalized the forming of waste.

Cleaner production application done by reconnaissance at soybeans making location and soybeans making process, also measuring of input and output quantity of soybeans making process including raw matterial, water and energy, so it can making easier to get cleaner production opportunities in soybeans industry by calculation material balance.

From the result of analyze, cleaner production application at soybeans industry such as, goodhousekeeping, water and energy usage reduction, water reuse, and technology modification.

Key words : Soybeans industry, Cleaner production

ANALISA DAN POLA PERSEBARAN RADIOAKTIVITAS PADA AIR DAN SEDIMEN (Studi Kasus : Sungai Code Yogyakarta)

Rr. PASCA SRI RETNANINGRUM (L2J 001 789)

Abstract

The around area in the river of Code Yogyakarta represent area which have the potency to yield waste in the form of radioactive waste which can enable the happening of radioactive contamination. This research done as a mean to identify radionuclide which implied in water and sediment samples in the river of Code Yogyakarta, knowing data of concentration (activity of average) and distribution pattern of radionuclide which identified to transmit betha (β) and gamma (γ) radiation in territorial water of river Code Yogyakarta, and also comparing concentration (activity of average) of radionuclide transmitting betha (β) and gamma (γ) radiation that implied in water and sediment of river Code Yogyakarta with permanently quality of PPRI No. 82/2001 and SK Gubernur DIY No. 214/KPTS/1991 . The sampel used by river water and sediment which is there in eleven (11) station of river Code, Yogyakarta. This water and sediment samples taken at dry season (August 2005). The result of this research got the activity of average of radionuclide transmitting betha (β) radiation at water sample is still below/under value float according to PPRI No. 82/2001 and SK Gubernur DIY No. 214/KPTS/1991 (equal to 1 Bq/L). Others, element of radionuclide which have been identified at this research represent group of nature radionuclide (^{210}Pb , Ra^{226} , ^{212}Pb , ^{214}Pb , ^{208}Tl , ^{214}Bi , ^{228}Ac , and ^{40}K). Inferential thereby that the environmental quality condition of river Code Yogyakarta from radioekology aspect is still be good.

Keyword: radioactivity, distribution, betha (β), gamma (γ), radionuclide

**Analisis Pengukuran Konsentrasi Radon
Dalam Permukaan Tanah Di Kawasan Nuklir Serpong (KNS)
Menggunakan Pylon Model AB-5**

Thoha Mustofa, Haryono S Huboyo, Nurandani Hardyanti

TRANSFER RADIONUKLIDA STRONTIUM-85 DARI AIR KE IKAN LELE (*Clarias.sp*) SEBAGAI PARAMETER KAJIAN DOSIS INTERNA PADA MANUSIA

Citra Puspitadewi, Sri Sumiyati, Poppy Intan Tjahaya.

ABSTRACT

*Contamination of ^{85}Sr in fresh water system caused by nuclear accident is possible to generate long term radiological effect because radiostrontium can enter into the food chain. ^{85}Sr in human body can be internal radiation source if people consume food contaminated with ^{85}Sr . Prediction of radionuclide transfer factor from water to fish is an important process in predicting the exposure dose to human body through food chain. In this research, catfish (*Clarias sp.*) were also raised in container with water medium of 500 L which had been contaminated with ^{85}Sr of about $1,81 \times 10^{-3}\text{MBq}$. The result of measurement by gamma spectrometer showed that the maximum activity of ^{85}Sr in total catfish sample was about 3084,62 Bq. The maximum concentration of ^{85}Sr on bone was about 2703,11 Bq/gram. Catfish uptake ^{85}Sr from water into its body and accumulated into abdominal organ, muscle, and bone with transfer factor of values respectively were about 1804,12 ml/gram; 110,22 ml/gram; 4,25 ml/gram. The validation of ^{85}Sr from water to catfish transport model resulted 21% correlation between the activity of ^{85}Sr in catfish that were calculated based on the model with the activity of ^{85}Sr in catfish measured on this research. Equivalent dose/year was calculated based on the maximum concentration of ^{85}Sr in muscle of catfish. By preparation process of catfish to lele fried, the concentration of ^{85}Sr was reduced from 6,37Bq/gram to 4,85 Bq/gram. The value of equivalent dose/year was received by human body consumed lele fried from catfish lived in water contaminated with ^{85}Sr was about $1,81 \times 10^{-3}\text{MBq}$ which correlated to 0,023 mSv/year. This amount of dose contributed of 0,0018 % the threshold annual equivalent dose from total consumption of food that was stated on Badan Pengawas Tenaga Nuklir Regulation No. 02/ka-Bapeten/V-99 (13mSv/year).*

Key words : equivalent dose/year, transfer factor, catfish, radiostrontium

TRANSFER RADIONUKLIDA CESIUM-134 DARI TANAH KE TANAMAN WORTEL (*Daucus carota*)

Sapta Yudha Lesmana, Endro Sutrisno, Poppy Intan Tjahaya.

ABSTRACT

*Soil contamination with radiocesium has a long-term radiological impact because it is readily transferred through food chains to human beings. Plant uptake is the major pathway for the migration of radiocesium to human diet. In this research, carrot plants (*Daucus carota*) were grown in a container filled with soil with 0,0283 MBq cesium-134. The uptake of cesium-134 was observed by measuring cesium-134 activity in tuber, stem, and root every 5 days within 74 days period of sampling. Measurement by gamma ray spectrometry shows the total cesium-134 activity in amaranth tissue until 74 days reached to the number of 0,257 Bq and the concentration of 1,071 Bq/gr. Carrot sorbs cesium-134 from the soil and accumulate them in the in tuber, stem, and root with transfer factor for each part are 0,3222; 0,1434; and 0,1226. Total transfer factor from soil to amaranth is 0,883 which is reached at day 51. Annual equivalent dose also calculated based on the activity of carrot plants at consentration maximal. The annual equivalent dose that will exposed human if they consumed carrot plants that were grown in soil with 0,0283 MBq contamination of cesium-134 is $3,34 \times 10^{-4}$ mSv/year. This amount of dose contributed $2,56 \times 10^{-5}\%$ of the threshold annual equivalent dose from total consumption of food that was stated in Badan Pengawas Tenaga Nuklir regulation No. 02/ka-Bapeten/V-99 (13mSv/year). Validation of cesium-134 soil to plant transport model result 81% correlation between the activity of cesium-134 in carrot plants that were calculated based on the model with the activity of cesium-134 in carrot plants that were measured on this research.*

Key words: *carrot, annual equivalent dose, radiocesium, transfer factor.*

”IMMOBILIZATION OF PILLARED CLAY CONTAINING RAFINAT WASTE FROM MOLIBDENUM-99 PRODUCTION BY USING POLYMER”

Herlan Martono, Husein Zamroni, Badrus Zaman, Mochtar Hadiwidodo dan Ratna Budiarti

ABSTRACT

Commonly available methods for the removal uranium from an aqueous solution include sorption using pillared clay as adsorbent. This research about sorption of uranium from aqueous solution with pillared clay and choosing best waste loading for immobilization pillared clay containing uranium by using epoxy resin polymer. Uranium used is simulation waste made from uranyl nitrate hexahydrate with 50 ppm in concentration. Pillared clay was made by reacting between Na-bentonite and zirconyl chloride ($\text{ZrOCl}_2 \cdot 8\text{H}_2\text{O}$). The research was carried out by varying influent factors to the adsorption process, variable of Zr as pillar material, contact time, and pH. Chosen variable would be used to make pillared clay containing uranium which would be immobilized by using epoxy resin polymer and varying waste loading. Optimum condition of uranium adsorption was obtained at Zr concentration of 0,01M, pH 7, contact time 16 in minutes with removal uranium 42.6%. Based on density, compressive strength, and leaching rate the best block polymer-waste was waste loading 20%. On this condition, the density of polymer-waste block was 0,9938g/cm³, compressive strength was 20, 179kN/cm and was no detection for leaching rate.

Key word : pillared clay, immobilization using epoxy resin polymer, waste loading, adsorption

IMOBILISASI ZEOLIT BEKAS PENYERAP LIMBAH RAFINAT DARI PRODUKSI RADIOISOTOP MOLIBDENUM-99 DENGAN POLIMER

Rayyen Firda * Badrus Zaman * Ganjar Samudro

ABSTRACT

Rafinat waste that produced by Instalation of Radioisotop Production is contained uranium. The research of uranium sorption by zeolite Alumino Silico Phosphate (ASP) and selected of best waste loading for immobilisation of saturated zeolite uranium used resin epoxy has been done. Uranium used is a simulation waste from uranyl nitrat hexahydrat which has 50 ppm in concentration. Zeolite ASP was made by mixing pure zeolite with Ammonium Dihydrogen Phosphate (ADHP). This research was done to variate the factor that influence the sorption process. Which are composition of zeolite ASP, retention time, and pH. The result of selected variable will be used for making saturated zeolite uranium will be immobilized with epoxy resin with variation of waste loading.

Optimum condition of uranium sorption reached on zeolite ASP 1:1 with pH 7 and retention time for 12 minutes with uranium removal efficiency 51,1 %. Base on density, compressive strenght, and leaching rate ,the best result for polymer-waste block is on 20 % waste loading. In that condition the density for polymer waste block is 1,0538 gram/cm³, the compreesive strenght 19,36 kN/cm³ and the leaching rate is not detected.

Key word: Sorption, zeolite ASP, waste loading, epoxy resin

ANALISA DISTRIBUSI KONSENTRASI NO_x (*NITROGEN OXIDES*) DI UDARA AMBIEN AKIBAT DARI EMISI KENDARAAN BERMOTOR DI DKI JAKARTA

ASTRINI (L2J 099 749)

ABSTRACT

Change of air quality is caused of existence of contamination which done by various activities sector. Dominant air pollution in DKI Jakarta is land transportation sector which have reached 70 - 80%. Amount of vehicle which progressively mount do not make balance to with effort to control contamination that happened. One of the polutan which come from many transportation is NO_x, representing appearance link of NO and of NO₂

Factor influencing concentration distribution pattern of NO_x is vehicle volume and wind direction. Model used to know year distribution pattern 2003, 10 prediction year come, and prediction with operation is *Gaussian Plume and Puff* model. Result of year simulation 2003 compared to result of observation and got value of $R = 0.8841$, this value indicate that result of simulation and observation enough near so that can be used for prediction to the future. Concentration of NO_x for the simulation of year 2003 and prediction accumulate in area of Jakarta Center, and many area which its concentration exceed standard quality of air of ambien. Mean concentration of NO_x year 2003 is 42.39 ppb, for prediction is 58.11 ppb, and for prediction with operation is 42.37 ppb. Mean concentration of NO_x this exceed standard quality of air of ambien annual that is 30 ppb.

Keyword : vehicle, NO_x, *gaussian plume and puff model*.

**ANALISA DISTRIBUSI KONSENTRASI TSP
(TOTAL SUSPENDED PARTICULATE) DI UDARA AMBIEN
AKIBAT DARI EMISI KENDARAAN BERMOTOR
DI DKI JAKARTA**

St. Pongky Afryandita (L2J 099 783)

Dr. Esrom Hamonangan, M.Eng

Haryono Setiyo Huboyo, ST, MT

ABSTRACT

Along growth of urban activity in DKI Jakarta, condition of air pollution will be ugly progressively in the future, if fuel used in transportation sector still release emission of contamination cause. One of the important pollutants that cause of this air contamination is TSP or total suspended particulate, which can bother bronchi.

Numerical model simulation with equation of Gaussian Plume And Puff used to see distribution of TSP, because of the pollutant measurement cannot be used to calculate condition in the future and limited by its measurement region. Result of calculation show correlation which enough sliver between simulation result and observation, by the value of $R = 0,896$ and $R^2 = 0,803$; so that the model applicable to predict the future.

TSP concentration in the year 2003 accumulation in center region of Jakarta with band and highest traffic volume, and lot of area have exceeded standard quality of air ambient for TSP ($90\mu\text{g}/\text{m}^3$); so also for the year 2013. Pattern of TSP distribution in Jakarta follow the traffic bands and not gone the round of in flatten and extend, because of the domination of calm condition in Jakarta's meteorological condition.

Keywords : TSP, dispersion, Gaussian Plume And Puff

**POLA PENYEBARAN GAS NO₂ DI UDARA AMBIEN
KAWASAN UTARA KOTA SEMARANG PADA MUSIM KEMARAU
MENGUNAKAN PROGRAM ISCST3**

PRATHIKA ANDINI GOESTY (L2J 000 790)

Ir. Mochtar Hadiwidodo Haryono Setyo Huboyo, ST, MT

ABSTRACT

North district of Semarang City is an area that are densely in population, transportation, and industry. Urban activities in this area produces pollutant. One of them is NO₂. This gas is hazard for human health, and can cause death even that concentration exceed standard level 150 µgr/m³. Inventory emission is used to identify sources that produce NO₂ gas and know the concentration. ISCST3 program become a tool to see content of NO₂ gas in ambient that is received by receptor. With assistance of Surfer program, result of the program are made isopleth map that shows dispersion pattern NO₂ gas.

Result of this observation shows that total emission of NO₂ gas in area observation is 0,001445 ton/year where is transportation give contribute 91,68 %, industry 8,31 %, and domestic 0,01 %. Dispersion pattern of NO₂ gas in ambient is influenced by the majority of air movement which is calm that makes NO₂ gas is concentrated in 3 regions. They are Pindrikan Kidul, Peterongan, and Tambakrejo.

Keywords : NO₂ gas, inventory emission, dispersion pattern

**KONSENTRASI TIMBAL (Pb) DALAM TANAH
AKIBAT EMISI KENDARAAN BERMOTOR
BERDASARKAN JARAK DAN KEDALAMAN
(STUDI KASUS JALAN BRIGJEN SUDIARTO SEMARANG Km 3-4)**

Sri Sumiyati, ST, MSi; Nurandani Hardyanti, ST, MT; Krisna Adhitya Wardhana

ABSTRACT

The increase of land transportation activity can result an environmental problem. One of them caused by presence of lead (Pb) in the environment. Lead is heavy metal which has toxic characteristic and can be used as a gasoline additive to increase gasoline octan number. The increase of lead (Pb) concentration make an environmental problem, include in soil. Soil is contaminated by lead from various sources. One of them by means of air lead as a result from motor vehicles emission that use leaded gasoline and than will be removed to soil because of rainfall.

This research was conducted in Brigjen Sudiarto Street Semarang Km 3-4 varied with depth of soil and distance from the road where 21 soil samples were collected within a depth of 0-4 cm, 4-8 cm, 8-12 cm, 12-16 cm from surface soil and distance 1 m, 5 m, 10 m, 15 m, 20 m, and 250 m from road.

Result of research from 21 soil samples indicate that the highest concentration of lead (93,5 mg/kg) occurred from soil sample with nearest distance from road (1m) at 0-4 cm soil depth. Other result show that concentration of soil lead generally decreases as both distance from contaminating sources and soil depth increases.

Keywords: lead, concentration, emission, distance, depth, road, and soil

ANALISIS TINGKAT KEMAUAN MEMBAYAR (WTP) MASYARAKAT

TERHADAP PENURUNAN EMISI CO KENDARAAN BERMOTOR

BERDASARKAN *CONTINGENT VALUATION METHOD*

(Studi Kasus : Kota Yogyakarta)

NOVITA CAROLINA DYAH MEDYA YANTI (L2J0 00 788)

Maryono, ST, MT

Haryono Setiyo Huboyo, ST, MT

ABSTRACT

One of the causes of traffic jams in Yogyakarta is the surplus of vehicles that isn't equalized with the length of the roads in the city. This can affect the decreasing of the air quality in Yogyakarta city. Pollution that is caused by the vehicles is consider as an external cost. This is way the pollution has to be value as an amount of money so it can be charged to the society that caused it in the first time. The purpose of this experiment is to know how much pollution that is caused by CO (carbon monoxide) which is caused by vehicles with 2 or 4 whells that uses gasoline for its fuel in Yogyakarta, and then followed by an analysis about the willingness to pay (WTP) with Contingent Valuation Method (CVM) of the society to decrease the emission level until it suits the threshold level. This experiment uses area under discussion sampling and surveys. Area under discussion sampling is done to measure the emission in Yogyakarta. Survey is done using quetioner that is spread to the drivers of the 2 or 4 whells that uses gasoline for its fuel in Yogyakarta. The infraction of the CO emission shows that during this experiment shows there are 59,13% infraction from the 4 wheel vehicle and 38,84% from the 2 wheel vehicle, and the willingness to pay from the vehicles owner is about Rp. 100.000 < WTP ≤ 150.000 for the 4 wheel vehicle and Rp. 20.000 < WTP ≤ 50.000 for the 2 wheel vehicle.

Key words: CO, CVM, WTP, emission, pollution, vehicle, Yogyakarta.

**ANALISA HUBUNGAN KONSENTRASI ANTARA POLUTAN PENCEMAR Pb DALAM TSP PADA BERBAGAI
PERUNTUKAN WILAYAH DI DKI JAKARTA**

SONYA SUSANTY (L2J 000 801)

Haryono S. Huboyo, ST, MT

DR. Esrom Hamonangan, MEng

ABSTRACT

Jakarta is a city which has reached a serious condition in air pollution. This research took 8 samples which are represents 5 land uses such as roadside, housing, industry, recreation spot, and sport center. The gravimetry method was used to get the concentration for the TSP and X-Ray Flourescence was used to get the concentration for Pb. The result for the TSP's concentration showed, land use roadside and industry which is $110,40 \mu\text{g}/\text{m}^3$ and $110,77 \mu\text{g}/\text{m}^3$ reached the concentration above the standard limit (PP No. 41/1999) which is $90 \mu\text{g}/\text{m}^3$. While all the concentration for Pb for all the land uses showed the concentration below the standard limit (PP No.41/1999) which is $2 \mu\text{g}/\text{m}^3$. A strong connection for Pb in TSP concentration showed in land use for roadside, housing and recreation.

Keywords: Pb, TSP, concentration connection

HUBUNGAN KONSENTRASI CO, NO_x DAN VOLUME KENDARAAN DENGAN
KONSENTRASI Pb DI UDARA AMBIEN
(Studi Kasus Kecamatan Banyumanik dan Pedurungan)

Hapyana Nur Pujiastuti (L2J000764)

Ir. Widiastuti, SU

Haryono Setiyo Huboyo, ST, MT

ABSTRACT

Transportation sector have a big contribution in yielding air pollutant like Pb, CO and NO_x. Heavy Metal Pb exist in air is about 80%-90% coming from vehicles. Pb is dangerous pollutant to human being for example degradation of intelligence level (IQ), death of baby before born, hypertension and heart attack. The aim of the research was to know the relation between concentration of CO, NO_x and vehicles volume with concentration of Pb on the air ambient.

Hypothesizes in this research was happened contamination by Pb on the air ambient and there are relation between concentration of CO, NO_x and vehicle volume with concentration of Pb. Dependent variable was concentration of Pb and independent variables were concentration of CO, NO_x and vehicles volume. Relation between vehicles volume and concentration of Pb expressed with equation $Y = 0,1378 e^{5,13E-05 X}$, relation between concentration of CO with concentration of Pb expressed with equation $Y = 0,1342 e^{1,1194 X}$ and relation between concentration of NO_x with concentration of Pb is expressed with equation $Y = 0,2466 e^{0,0343 X}$. Result indicated that the maximum concentration of Pb measured in Banyumanik and Pedurungan were 0,488 µg/m³ and 1,551 µg /m³ still under standard quality of Decision of Governor Central java No 8 /2001.

Keywords: Heavy metal Pb, CO, NO_x, vehicles volume, pollution.

**PENGARUH KEPADATAN KENDARAAN BERMOTOR DAN ANGIN TERHADAP
KONSENTRASI TIMBAL (Pb) PADA DAUN ANGSA (*Pterocarpus indicus*) DAN MAHONI
(*Swietenia macrophylla*)**

DI MUSIM KEMARAU

(Studi Kasus : Kota Semarang)

Ari Arsianti, Sri Sumiyati, Haryono Setiyo Huboyo

ABSTRACT

Leaf is part of the trees that has an important function such as exchanging gas with air surrounding, so that lead (Pb) that emitted by vehicle engines will be caught on leaf stomata. The purpose of this research is to know the effects of vehicles capacity and winds on lead concentration in leaves, Angsana and Mahogany, at dry season.

This Research uses analytical laboratory method that makes leaf preparation then measured lead concentration on AAS (*Atomic Absorption Spectrophotometer*). Forty three samples have been analyzed. The research locations are located in Jl. Rinjani, Jl. Merapi, Jl. Papandayan, Jl. Sisingamangaraja, Jl. Diponegoro, and Jl. S. Parman. All the roads have different vehicles capacity.

The Result shows that lead concentration in leaf are Angsana 0,2280 – 1,0381 $\mu\text{g/g/cm}^2$ and Mahogany 0,2474 – 1,8245 $\mu\text{g/g/cm}^2$ in various vehicles capacities 1488 – 69240 vehicle/day. Vehicles capacity variable shows that when vehicles capacity getting higher, lead concentration in leaf, Angsana and Mahogany is also higher. Wind velocity variable has weak relation and no real effect on lead concentration in leaf, Angsana and Mahogany.

Keywords : lead concentration, Angsana leaf, Mahogany leaf, vehicle capacity, wind velocity

**STUDI KONTRIBUTOR PM10 TERHADAP UDARA AMBIEN
DENGAN MODEL RESEPTOR : CHEMICAL MASS BALANCE
(STUDI KASUS WILAYAH PEDURUNGAN)**

Eko Primabudi

Haryono S Huboyo M Arief Budiharjo

ABSTRACT

High concentrations of fine particulate matter currently represent the main air quality problem in Semarang, and in order to develop effective control strategies it is necessary to estimate the contributions of different sources to the ambient air quality. The application of receptor models for source apportionment can provide useful insight into this problem. The US-EPA CMB v8.2 receptor model (US-EPA, 2001) was applied to a set of PM10 data collected in Pedurungan monitoring station for Semarang Regional Environmental Impact Control Agency (Bapedalda) urban air quality monitoring, with the goal of estimating the relative impact of different local emission sources on PM10 concentrations, of quantifying the sources contribution such as vehicle exhaust, and investigating the source profile based on actual conditions, such as landuse and winds. Since the chemical mass balance method also requires source profiles to be known, EPA Speciate database v3.2 was provided to quantify mass abundances of chemical species in each profiles. Those profile include emission from transportation, geological material/soil dust, sea salt spray, and secondary particle (ammonium nitrate and ammonium sulfate).

Keywords : PM10, receptor model, source contribution, source profile

**HUBUNGAN VOLUME KENDARAAN BERMOTOR, SUHU, KELEMBABAN, ARAH DAN
KECEPATAN ANGIN DENGAN KADAR NO₂ DI RUAS JALAN (OUTDOOR) DAN DI
RUANG PARKIR BASEMENT (INDOOR)
(Studi Kasus : Malioboro Mall, Yogyakarta)**

Donne Susanto Diharjo, Haryono Setyo Huboyo, Endro Sutrisno

ABSTRACT

One of the main source of NO₂ (Nitrogen Dioxide) in urban district come from motor vehicle. NO₂ concentration exceeding boundary sill earn to endanger environment and can cause health problem or even death. Problem of ambient air pollution is connected with the source of emission and meteorology factor that effect to its dissemination and polutant change in the outdoor and indoor environment. Malioboro street represent district with high motor vehicle density and Malioboro Mall is one of the most crowded shopping centre in Malioboro street which have indoor parking area. This research is intended to know factors that influenced the concentration of NO₂ ambient in outdoor and indoor environment and its difference. Saltzman method used in the intake of NO₂ ambient sample as dependent variable, and as the independent variable are motor vehicle intensity, temperature, humidity, wind speed and direction. From the result of research, the concentration of NO₂ ambient at Malioboro street (outdoor) ranging from 21,90 – 31,90 µg/m³ at 27,02 µg/m³ as average and by statistical analysis indicate that 63,9% of NO₂ concentration are influenced by motor vehicle intensity, temperature, wind speed and direction, while for the humidity variable is not shown any significant relation. Meanwhile the concentration of NO₂ ambient in Malioboro Mall basement parking area (indoor) ranging from 47,00 – 109,05 µg/m³ at 75,36 µg/m³ as average and by statistical analysis indicate that 37% of NO₂ concentration are influenced by motor vehicle intensity, while for the temperature, humidity, wind speed and direction is not shown any significant relation. The number of NO₂ ambient concentration is still below the ambient quality rules which have been specified by DIY Province through DIY Governor Decision No.153 at 2002 that is equal to 400 µg/m³. We can also conclude that the average of NO₂ ambient concentration in basement parking area (indoor) almost 3 times bigger than the average of NO₂ ambient concentration at Malioboro street (outdoor) that is caused by the difference of meteorology factors that effect to air polutant, specially NO₂.

Keyword : Humidity, Malioboro, Motor Vehicle, NO₂, (Nitrogen Dioxide), Temperatur, Wind

RISK ANALYSIS OF TSP AND LEAD CONCENTRATION IN THE STREET TO THE HUMAN HEALTH IN JOGJAKARTA CITY (CASE STUDY)

Esti Handayani, Haryono Setyo Huboyo, Syafrudin*)

Abstract

Air exist in around human being contain many pollutant from various source, especially from motor vehicle emission in the street every day. Pollutant that are dangerous for human health because having the character of carcinogen for example TSP and Lead. So also Jogjakarta city representing town its traffic so that contamination effect of the pollutant high also. There are four steps in risk analysis research. There are hazard identifications, exposure assessment, toxicity assessment, and risk characterization. Hazard identifications to TSP and Pb concentration show that maximal concentration on the air for the TSP is $230 \mu\text{g}/\text{m}^3$ and for Pb is $2 \mu\text{g}/\text{m}^3$. Exposure assessment step show that TSP concentration in Wates street, Janti, Godean street, Solo street, PKU Muhammadiyah, and STTL more than maximal concentration which tolerate according to Kep. Gub. DIY No. 513 tahun 2002. Toxicity assessment show that intake TSP in all place not yet exceeded maximal intake which enabled that is equal to $0,074 \text{ mg/kg.day}$. Intake Pb in all place also not yet exceeded maximal intake which enabled that is equal to $0,00065 \text{ mg/kg.day}$. From result of risk characterization can be taken conclusion that level of total risk in all place less than one so that in the area still competent and peaceful to be used as residence. The biggest risk is in the Ahmad Dahlan street, that is 0,045, and then the smallest risk is in the Magelang street, that is 0,019. Average total risk in Jogjakarta City is 0,034 so it is still under maximum standard risk, that is 1.

Keywords : Air, TSP, Lead, Risk Analysis

PENYISIPAN TiO_2 PADA KARBON AKTIF UNTUK MENURUNKAN KONSENTRASI CO DAN NO_2 PADA EMISI GAS BUANG KENDARAAN BERMOTOR BERBAHAN BAKAR BENSIN

Rahma Sih Pratiwi*, Haryono Setyo Huboyo*

ABSTRACT

Active carbon can be used as media of adsorption CO and NO_2 gas at emitted motor vehicle. Of research result it was known that active carbon media which attached length 5 cm, 10 cm and 15 cm at bed adsorption gave degradation of CO gas concentration equal to 76,316 %, 80,866 % and 82,785 %. Respectively at concentration of TiO_2 15 %, 10 % and 15 % added at active carbon media with media length 15 cm gave degradation CO gas concentration equal to 83,88 %, 87,5 % and 92,76 %. While for the gas of NO_2 , active carbon which attached length 5 cm, 10 cm and 15 cm at bed of adsorption gave degradation NO_2 gas concentration equal to 78,897 %, 88,934 % and 90,051 %. At concentration of TiO_2 15 %, 10 % and 15 % added at active carbon media with length 15 cm gave degradation NO_2 gas concentration equal to 92,720%, 93,081% and 94,338 %.

So that from research result known that active carbon media which attached at media length 15 cm had efficiency degradation CO and NO_2 gas concentration highest compared to active carbon media which attached at media length 5 cm and 10 cm. Active carbon media was inserted by TiO_2 could increase degradation of CO and NO_2 , gas concentration compared to active carbon media without insertion of TiO_2 . Active carbon media with concentration of TiO_2 15 % which set at 15 cm length on bed adsorption had saturated time 25,37 hour. The cost of making this media typical was around Rp 1400,00.

Keyword : CO, NO_2 , active carbon, adsorpsi, TiO_2 , intercalation, saturated time.

**STUDI PERUBAHAN KONSENTRASI KARBON MONOKSIDA (CO) PADA VARIASI WAKTU DAN
JARAK MELINTANG DARI JALAN
(STUDI KASUS: JALAN P. DIPONEGORO, UNGARAN)**

Bhirowo Herusasonko¹, Syafrudin², Haryono Setyo Huboyo³

ABSTRACT

Ungaran as the capital city of Semarang Regency is linearly developing rapidly along Jalan Gatot Soebroto and Jalan Pangeran Diponegoro. The high concentration of traffic along that route causes high concentration of pollutant emitted from motor vehicles, including CO gas which adversely affects the health of population. This research was aimed to study the trend of CO concentration based on variations of measurement time and lateral distance from the road to identify the point of location where the CO concentration has reached the level below the quality standard. The measurement was conducted on both sides of the road on lateral distance from 0 to 10 meters from the edge of the road for seven days on April 2008 starting from 06.30 AM until 05.45 PM. Data analysis showed the presence of CO concentration trend based on time of measurement. During work days, CO concentration in the morning reached level above 20 ppm then dropped to level 12 – 15 ppm at noon, then rose again to reach level above 20 ppm in the afternoon. On holiday, the CO concentration in the morning and at noon was rather fluctuating but relatively low. It rose to reach level ± 20 ppm in the afternoon. This research found that traffic flow and mean ambient CO concentration are correlated with positive correlation coefficient of 0.943 in workdays and 0.628 in holiday. This research concluded that on both sides of the road, the average concentration of CO started to reach below the level of 12 ppm, as stated in the quality standard, on 2 meters distant from the road edge and continued to decline up to 10 meters distant from the road.

Keywords: Carbon monoxide (CO) concentration, Quality standard of CO concentration, Lateral distance, Road

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**POLA DISPERSI EMISI SO₂ PT. INDONESIA POWER UBP SEMARANG
DI SEMARANG BAGIAN UTARA DENGAN MENGGUNAKAN PROGRAM CALPUFF 5.7
(Studi Kasus: Kota Semarang)
Mohamad Gigih Gulanang, Haryono Setyo Huboyo, Nurandani Hardyanti**

IDENTIFICATION STUDY OF ENVIRONMENTAL NOISE QUALITY IN SEMARANG PONCOL RAILWAY STATION

Fatma Agustia Rahmi, M. Arief Budihardjo, Sri Sumiyati*)

Abstract

The existence of vehicle is one of many urgent aspect in an urban area, as is in Semarang. Transportation activity is not get out of regulation about environmental management in 1997. Noise is one of environmental quality parameter. And railway transportation have noise potentially. Activity in railway station make noise which have to efficiently managed. Therefore, it is need to know the noise level in railway station because it can impact to people. The evaluation, calculation and measurement method of noise level based on the ministry of environment regulation about noise level threshold. In addition to evaluate the noise level, this research also purpose to know the influence of distance measurement (1,5 meter, 4 meter and 5 meter) and railroad platform area (west, middle, east) with noise level using Randomize Complete Block Design Method and Duncan Multiple Range Test. The result of this research indicate that noise level in Semarang Poncol Railway Station pass over the noise level threshold (65 dBA) with + 3 tolerance. By this research, also ascertainable that the distance of measurement (1,5 meter, 4 meter and 5 meter) and railroad platform area (west, middle, east) influence the noise level.

Keywords : Noise level, railway station and KEPMENLH/48/1996.

**NOISE REDUCTION ANALYSIS BECAUSE OF ABSORPTION FACTOR OF
VEGETATION WITH NOISE SOURCE FROM TRAIN RAILWAY
(STUDY PLACE : MANGKANG KULON)**

Mardanila Sari, M. Arief Budihardjo, Sri Sumiyati

ABSTRACT

Train is one of public service, commodity distribution infrastructure and land mobility transportation Mangkang Kulon is one of region Semarang city placed in Tugu subdistrict. Mangkang railway is a small train station which established before the colonizer time. As a public service the train station also give disadvantage to the surrounding. Train have the negative impact such as noise to solve the problem using the vegetations which is planted around the railway. Based on the noise control, the vegetations which is function as reductor with it absorption factor (Doelle in Sasongko, 2004). The train noise level in Mangkang is in high level which is reached to 105,6 dBA for noise temporary level (Lp) and reached 78.76 dBA for noise equivalent (Leq), this number is exceeded the quality standard of environmental quality for a residential, which is based on Ministry of Enviromental Regulatory No. 48/MenLH/11/1996 date on November 25th 1996 is 55 dBA. The noise level between in the west side side of railway near to the vegetations place and in the east side of railway, there is no vegetation existed. The range for noise reduction reached out 4.32-10.53 dBA which is a reduction noise value taken from 7 measurements time. The reduction process happen due to so many various of vegetation around the train lane which dominated by bamboo (Bambusa. Sp) with height between 2-5 m with a dense stalk and pointed leaves : Embun grass (Polytrias Amaura) with height 1-5 cm, Banana tree with height 1-2 m and wet rice fields give contribution also to the train noise reduction, because the distance of those vegetations is closed enough, then the noise reduction value output is big enough. There for bamboo (Bambusa. Sp) can be of alternative way to reducing noise level.

Keywords : Railway, noise, noise temporary level (Lp), noise equivalent (Leq), absorption factor, reduction.

**PENENTUAN FAKTOR EMISI GAS CO (KARBON MONOKSIDA)
DARI PEMBAKARAN SAMPAH DOMESTIK SECARA TERBUKA
DI WILAYAH KOTA SEMARANG
(Studi Kasus : Kecamatan Tembalang)**

Dian Rico Fanadi, Nurandani Hardyanti, Irawan Wisnu Wardhana ^{*)}

ABSTRACT

Open burning waste is one of the most and easy way to reduce waste problem. The incomplete combustion will cause some air pollution such as CO (Carbon Monoxide), which cause by incomplete combustion. The amount of CO emission tend equal with simulation combustion by incinerator, ten samples were taken, aim to SK SNI M-36-1991-03. Samples divided into two groups base on their economic background, such as medium-high and medium-low, and emission sample taken by electrochemical method. Total mass, total volume, and an-organic mass of waste have positive correlation with the emission of CO concentration. It shows by significant correlation ($\alpha=0,01$, $N=10$). Combustion waste has significant and positive correlation with CO concentration ($\alpha=0,01$, $N=10$), in other hand organic mass of waste don't have significant correlation with CO concentration ($\alpha=0,05$, $N=10$). The Average of CO emission which cause by open burning waste in Kec. Tembalang is 88405,943 mg/kg waste mass or about 88,405 g/kg waste mass.

Key word : Open Burning, Emission Factor, CO (Carbon Monoxide), Tembalang, Semarang

**PENENTUAN FAKTOR EMISI NO (NITROGEN MONOXIDE)
DARI PEMBAKARAN SAMPAH TERBUKA DI KOTA SEMARANG
(Studi Kasus : Kecamatan Tembalang)**

Winardi Dwi Nugraha *), Mochtar Hadiwidodo*), Abung Hary Prayogo)**

ABSTRACT

The Increase of residents number that followed by public activities will give affect to solid waste arising. The treatment of domestic solid waste which is done by public is by open burning. Pollutant gas which is produced by open burning activity is NO. If the activity is being done in huge number will give big impact to the environment and human being due to air pollution that caused by it. This aim of the research is to determine the NO (Nitrogen monoxide) gas emission factor which is produced from open burning, through the simulation of solid waste that using incinerator. The number of solid waste sample which is taken from Tembalang District are 10 sample, and have been taking by using the differencing based on level of economics social. The measurement of NO gas emission is using EcoLine 6000 equipment with electrochemical method. The periodically emission measurement is being done during the burning process or until burning is assumed completed, that is when lag only material which is combustible difficult or flame has died. Emission concentration of NO gas will be influenced by solid waste characteristic and the burning process. The value of emission factors based on concentration of pollutant, turbulent of air flow rate, burning duration, and weight of solid waste that have been burned. The value of emission factor NO gas for burning every weight of solid waste is 2078,663 mg/Kg.

Keywords : *Emission factor, Gas NO, Open burning*

**ANALISIS KONSENTRASI PARTICULATE MATTER 10 (PM_{10})
PADA UDARA DILUAR RUANG
(STUDI KASUS : STASIUN TAWANG - SEMARANG)**

Agung Febriansyah; Ir. Endro Sutrisno, MS^{*)}, Haryono Setiyo Huboyo, ST, MT ^{*)}

Abstrack

One of the contaminant that contain in the air is particulate. The research is been done in Tawang station – Semarang, to know the PM_{10} concentration and to measure the quantification of risk that stands and train's employee accepted. Sampling process being done in two point such as surrounding stands and train's employee. The research used dust sampler type DS 600 – 03 instrument to measure PM_{10} , and for the gravimetric analysis used mettler toledo pair of scale type AG 245. PM_{10} concentration surrounding stands in work day and weekend are 202,92 $\mu\text{g}/\text{m}^3$ and 211,17 $\mu\text{g}/\text{m}^3$, while the PM_{10} concentration surrounding the train's employee in work day and weekend are 149,37 $\mu\text{g}/\text{m}^3$ and 173,84 $\mu\text{g}/\text{m}^3$. In conclusion of the research that the PM_{10} concentration surrounding stands and the train's employee in weekend exceed the quality standard that been fixed before (150 $\mu\text{g}/\text{m}^3$). The risk value of PM_{10} to stands and train's employee are 0,05 and 0,04

Key words : Air quality; PM_{10} ; Tawang stasion, Semarang.

**PENENTUAN FAKTOR EMISI *TOTAL SUSPENDED PARTICULATE* (TSP) DARI PEMBAKARAN
SAMPAH DOMESTIK SECARA TERBUKA DI KELURAHAN TEMBALANG, METESEH DAN
BULUSAN KECAMATAN TEMBALANG-SEMARANG**

Arianto Wibowo, Irawan Wisnu Wardana, Endro Sutrisno

**ANALISIS KONSENTRASI BLACK CARBON DALAM
PARTICULATE MATTER 10 (PM10) PADA UDARA DALAM RUANG
(STUDI KASUS : DAPUR RUMAH TANGGA
BERBAHAN BAKAR KAYU DAN MINYAK TANAH)**

Dini Nova Sari, Haryono Setyo Huboyo, Nurandani Hardyant

Abstrack

Cooking activity kitchen yield black carbon pollutant & become the main source of the pollutant distribution. Generally, Indonesian kitchen is using fire-wood and soil as a cooking fuel that's been convinced shall cause some pollutant distribution up to the air. BC is impurity form the uncomplete burning, fossil fuel or biomassa burning (Goldberg, 1972). In this research, the formation of black carbon in PM10 is based on reflection methode using EEL Smoke Stain Reflectometer. The air samples is taken from 10 hous hold kitchens in the area of Semarang city with fife (5) sampling ponits in the kitchens that is using soil oil fuel and five sampling points in the kitchen that is using fire-wood fuel. In those kitchens, the sampling proses is been done for one hour cooking activity and one hour in stop condition. The result of the research show that the kitchen which is using fire-wood fuel in stop condition which is there's no coking activity the range consentration of black carbon are $3,595 \mu\text{g}/\text{m}^3$ - $83,803 \mu\text{g}/\text{m}^3$; and in the condition of cooking activity the range concentration are $35,255 \mu\text{g}/\text{m}^3$ - $83,803 \mu\text{g}/\text{m}^3$ In the kitchen which is using soil oil fuel in stop condition which is there's no cooking activity the range concentratio of bc are $2,324$ - $5,749 \mu\text{g}/\text{m}^3$ and in the condition of cooking activity the range concentration are $6,908 \mu\text{g}/\text{m}^3$ - $22,293 \mu\text{g}/\text{m}^3$

Key woord :black carbon, PM10, cooking, kitchen.

**THE STUDY OF BIOAEROSOL INDOOR AIR
(BAKCTERIA AND FUNGI) IN BOARDING HOUSE
AT TEMBALANG, SEMARANG**

Isro'im Maghfiroh, Haryono S. Huboyo, ST, MT, Sri Hapsari, ST, MEngSc

ABSTRACT

Bioarosols play a significant role in indoor air pollution as they can be pathogenic or cause an allergic reaction following inhalation. In this study, indoor bioaerosol measurements are presented from 10 boarding houses in Tembalang, Semarang. Samples were taken by using a Merck MAS-100 bioaerosol collector. Concentrations of airborne bacteria was measured as colony forming units per cubic meter of air (CFU/m³) collected by impaction onto nutrient agar plates, than continued with detection of species streptococcus by culture methods on blood agar plates. In the other side, identification of fungi collected by impaction onto potato dextrose agar plates. The results are, concentrations of airborne viable bacteria averaged between 1269 CFU/m³ (± 292), assessment of 2 samples having highest and lowest concentration showed no detected Streptococcus sp. and all samples identified positive fungi. The bacteria data are correlated with natural ventilation and volum in the building in order to know relationship these variables. Caused air quality can be compromised when there is inadequate ventilation, when outdoor pollutants enter fresh air intakes, or when mold or other microorganisms grow inside the building. Developed regression models have been explained about 0,116 natural ventilation and 0,751 volum influence the concentration of bacteria in indoor air.

Keywords : Bioaerosols, indoor air, bacteria, streptococcus sp., fungi, CFU, natural ventilation, volum, linier regression, boarding house.

**ANALISIS KONSENTRASI *PARTICULATE MATTER* 10 MIKRON (PM_{10})
PADA UDARA DALAM RUANG
(STUDI KASUS : DAPUR RUMAH TANGGA
BERBAHAN BAKAR KAYU DAN MINYAK TANAH)**

Anggrika Riyanti; Haryono Setiyo Huboyo^{*)}, M. Arief Budihardjo^{*)}

Abstract

Indoor air pollution from fuels burning use in households cooking of the developing countries is estimated to be one of the main health risks worldwide. One of pollutant from cooking is PM_{10} . This study estimates PM_{10} exposure in households kitchen along with its influence to ventilation and kitchen volume. Sampling was taken in ten locations, five samples located in kitchen using woods and another in kitchen using kerosene. Dust sampler model DS 600-03 used to measure PM_{10} concentration and Neraca Mettler Toledo Tipe AG 245 for gravimetri analyse. The average of PM_{10} concentration in wood cooking is estimated at $1340,04 \mu\text{g}/\text{m}^3$, while in kerosene cooking is $182,93 \mu\text{g}/\text{m}^3$. This rate is higher than EPA standard for PM_{10} indoor, which is set at $150 \mu\text{g}/\text{m}^3$. From this study, we can conclude that type of fuels used have great influence to the rate of PM_{10} concentration indoor. Ventilation (including doors and windows) doesn't give much influence because its size of opening and the location are not appropriate so that disturbing the air movement indoor. It is predicted that the other factor influences PM_{10} exposure indoor are cooking duration, efficiency of the stoves and material used in building construction.

Keywords: Indoor air pollution; PM_{10} ; Fuels; Cooking

THE APPLICATION OF GAUSS MODEL AND BOX MODEL IN THE SPREAD PATTERN OF THE AIR POLLUTANT (NO₂ AND SO₂) IN THE AREA OF POWER PLANT DEPARTMENT, BENETE, PT. NEWMONT NUSA TENGGARA

Roro Nawang Wulan, Sri Sumiyati, ST, Msi, Haryono S. Huboyo, ST, MT

ABSTRACT

NO₂ and SO₂ are the pollutants which are mostly produced by Diesel Energy Power Station and Steam Energy Power Station. In the application of Gauss Model and Box Model, meteorological factors such as wind speed and direction, as well as the sun's duration, are very influential to the pollutants emitted by the source. The research steps begin with the measurement of the air pollutants in three places, i.e. Benete Port 1 (200 m), Benete Port 2 (600 m) and Benete Port 3 (1000 m) for 24 hours by using a set of tools called Mobile Trailer Analyzer. The concentration of the ambient resulted from the measurement, then, is validated with the concentration resulted from the calculation by using Gauss Model and Box Model. The validation average of the Gauss Model for SO₂ is 37.9 % and for NO₂ is 20.9 %. The choice of the model is based on the smallest validation value, so that the appropriate model to be used for the area of Power Plant Department is Box Model. The biggest concentration in Benete Port I is (NO₂=7.1 ppb and SO₂=5.0 ppb) while the smallest concentration is (NO₂=6.3 ppb and SO₂=4.1 ppb). The biggest concentration in Benete Port II is (NO₂=7.0 ppb and SO₂=4.7 ppb) while the smallest concentration is (NO₂=3.2 ppb and SO₂=1.6 ppb). The biggest concentration in Benete Port III is (NO₂=6.9 ppb and SO₂=5.5 ppb) while the smallest concentration is (NO₂=5.1 ppb and SO₂=3.5 ppb). From the model imaging using Surfer Program, it can be seen that the spread pattern of the pollutants dominantly goes to the north-west direction.

Keywords : Gauss Model, Box Model, Mobile Trailer Analyzer, NO₂ and SO₂, Model Validation, Spread Pattern

ANALYSIS CORELLATION OF VEHICLE QUEUE TO CARBON MONOXIDE CONCENTRATION IN ONE ARM OF SETIABUDI INTERSECTION IN SEMARANG CITY

Farraditta Agifrilicia, Haryono Setiyo Huboyo, Endro Sutrisno

Abstract

The Using of fuel for motor vehicle always produce Carbon Monoxide compounds. The Carbon Monoxide is poisonous, because it can be causing nerve system and heart poisoned. This research is measuring the Carbon Monoxide in one arm of Setiabudi intersection in Semarang using Carbon Monoxide (CO) Digital Analyzer. This research has been done for six days from Friday until Wednesday, in 12 hours since 06.30 AM until 18.15 PM. The purpose of this research are knowing the correlation of Carbon Monoxide concentration and Total of vehicles queue, comparing of Carbon Monoxide concentration with Standard of Air Quality Ambient from Kep Gub Jawa Tengah. Carbon Monoxide concentration Standard is 15.000 $\mu\text{g}/\text{m}^3$ in one hour. According to result of the test, using Non-Parametric Correlation Test with Spearman Method, the value of Asymtot is 0,000 or $p < 0,05$. So that, H_0 is refused. It means that there is correlation between Carbon Monoxide concentration with Total of vehicles queue. The second hypothesis is resulting about 30 hours of Carbon Monoxide concentration is under of ambient standard, and about 42 hours is above of ambient standard. But It can not be concluded that Carbon Monoxide in Setiabudi Intersection is above of ambient standard. Because there are many factor that influencing. They are temperature, direction and speed of wind, condition of vehicle machine, and fuel type.

Keywords: Carbon Monoxide (CO), Concentration, Total of vehicles queue, Intersection

NOISE ANALYSIS FOR THE HEARING ABILITY WORKER OF THE UNIT SPINNING 1 DEPARTMENT RING FRAME PT APAC INTI CORPORA

Haryono Setiyo Huboyo; M. Arief Budihardjo; Adjeng Reni Nindita^{*)}

ABSTRACT

The growth of industry increase the using of machines that have a big capacity of production. However their operation produce noise that can be hazardous to the workers' health and safety. The main effect of noise to the human is can make our ears def. In this research we discuss about the effect of noise to the hearing sense PT Apac Inti Corpora Unit Spinning 1 Departmen Ring Frame employees. Noise level at Department Spinning 1 Unit Ring Frame Apac Inti Corpora reach 93-97 dBA. Insufficient standard noise value based on ministry worker decree RI no KEP-51 / MEN / 1999 is 85 dBA. So it's value had been upper standard noise value. Based on the listening test which is did using audiometry on 10 worker, gets 2 worker had decrease listening ability. With this noise research of hearing ability to the worker, decreasing of hear ability could be minimize by using earplug or limitation work time.

Keyword: Noise, Audiometry, Earplug.

**COMPOSITION ANALYSIS OF HEAVY METAL (Pb, Cr, Cu, Cd, Fe, Zn, Al, Mn) IN
PM₁₀ ON WEST SIDE KRAPYAK INTERSECTION
SILIWANGI STREET 6th KM SEMARANG CITY**

Ken Istyawati, Endro Sutrisno, M. Arief Budiharjo

ABSTRACT

Krapyak is a mixed area. In area, There are housing, Candi Industrial Area, human activity and there is one of main roads, is the Siliwangi Street, which is a west gate to Semarang City. Due to activity concentration along Siliwangi Street, then can be predicted that there is many of PM_{10} composition that dangerous to human health. Previous study conducted by Badan Lingkungan Hidup Semarang, shows that a significant PM_{10} concentration occurs, so this investigation is formulated. The result shows that heavy metal composition in PM_{10} Siliwangi Street are Pb, Zn, Cu, Fe, Cd, Cr, Mn, Al respectively. The heavy metals mainly come from transportation activity rather than industrial activity, because sampling area near to main road rather than industrial area. Meteorological factor, like density and temperature effected PM_{10} concentration but not to PM_{10} composition. The wind affected to dispersion of PM_{10} concentration and composition.

Keywords : PM_{10} , heavy metals, Pb, Cr, Cu, Cd, Fe, Zn, Al, Mn, meteorological factor

PERENCANAAN SISTEM PENYEDIAAN AIR BERSIH RUMAH SAKIT BETHESDA YOGYAKARTA

DIPTYA DHYAKSARI (L2J 099 753)

Ir. Mochtar Hadiwidodo, Nurandani Hardyanti, ST, MT

ABSTRACT

Bethesda hospital in Jogjakarta at the moment has 73% services based on Bed Occupation Ratio (BOR) in the year 2003 and 2004. To increase the quality of service and take care of good sanitation, hence expected to reach 100% of clean water service. At Bethesda hospital there are 4 shallow well with 12 liters/second of charge, the amount cannot fulfill the clean water required so that done by addition of 3 liters/second water which taken from deep well. Problem of the quality of the deep well evaluated from Permenkes No. 907/Menkes/SK/VII/2002 known the parameter manganese (Mn) with the rate 0,3 mg/liter, it's a problem for drinking water, so the solution is made a water treatment with pressure filter with activated sand media. The planning of water distribution is simulated with Epanet 2.0 and obtained head average 16 meter, average velocity 1,3 meters/second, and average water level 8,5 meters.

Keywords: deep well, clean water distribution

RENCANA PENGEMBANGAN SISTEM PENYEDIAAN AIR MINUM KOTA KLATEN

SRI HAPSARI BUDISULISTIORINI(L2J099790)

Ir. Tri Joko, MSi dan Ir. Endro Sutrisno, MS

ABSTRACT

As a capital of Klaten Regency, Klaten City's water demand is accomplished by non piping system (ground water) and piping system (PDAM). At year 2002, PDAM's service covered 49 % of the citizen of Klaten City. There are several problems with the existing condition of water supply system, that are the incapability of the system to fulfill customer's water demand, and the limited capacity of ground water, which quality is not suitable with the standard. This condition proved that Klaten City needs water supply system development.

Analyses begin by comparing the existing condition with city planning and design criteria. The results will be the basic concept for development design. The analyses results shows that water production could only supply the present demand. Network pressure not suitable with the design criteria so it cannot serves all area. The reservoir capacity is less than 10 % of maximum daily needs, that is not suitable with the criteria. Based on these, the water supply system will be developed, which are include water sources system, transmission, distribution, and reservoir. Water sources development conducted by adding two units of deep weell, with total capacity 30 l/s. Transmission system will be using PVC pipe, with 150 mm in diameter and 150 m in length. Distribution network development includes new distribution line and adding pipes which are paralel with the old ones to increase water flows and pressures. Distribution pipes will be using PVC pipe, with 100 mm until 250 mm in diameter. The new reservoir is a tower reservoir, which volume is 1000 m³.

The developing of Klaten City will be increasing the water demand. The water supply system must accomplish the basic concept of water quality, quantity, and continuity. To accomplish it, Klaten City needs a capable water distribution network design.

Key words : water distribution, piping system, network design

**RENCANA PENGEMBANGAN
SISTEM DISTRIBUSI AIR BERSIH (KAWASAN UTARA KOTA SURAKARTA)**

Warningsih (L2J 099 792)

Ir. Mochtar Hadiwidodo dan Ir. Theresia, MSi

**PERENCANAAN SISTEM PENYEDIAAN AIR MINUM
IKK SAMBUNG MACAN KABUPATEN SRAGEN**

MUHAMMAD PURWAKA ADI NUGRAHA (L2J 099 776)

Ir. MOCHTAR HADIWIDODO dan WIHARYANTO OKTIAWAN, ST, MT

Abstrack

Sragen Town is the capital town of Sragen's regency, Province of Central Java. Accomplishment of drinking water in Sragen Town is doing by non-piping sistem and piping sistem (PDAM). The PDAM procentage of service is 46 % from the total of population until end of year of 2003. There are many problems in water supply system of PDAM Sragen, and the most serious problems are pressures, water losses, and the energy supply. The five distribution sistems evaluations give bad results, which a lot of point of tapping have problem with the insuffience pressures, and it gives impact un optimal services to the customers of PDAM. So, the evaluation recommend to rehabilitate the distribution network and not a network expantion and development. The Planning of system development of water supply system will do in IKK Sambung Macan, because the urgent of the water supply sistem for this place. The result of survey showed 71 % the IKK Sambung Macan population Want to be PDAM customer.

Key words : water supply system, evaluation, development, distribution network,

Application of Integrated Programs of Geographical Information System (MapInfo 6.0) and Network Analysing (EPAnet 2.09) for Estimating Water Loss in Public Water Industry

(Case Study: Water Loss as Long as Primary Pipelines at Sampangan All Around Region in Semarang City)

Endro Sutrisno, Badrus Zaman*), Yuli Sulistiyohadi)**

ABSTRACT

Development of Geographic Information System (GIS) such as tools for phenomenon analysing basic on geographical integrated data, so analysing has done by holistic and spacial scope. Integrated design of GIS software (MapInfo 6.0) with pipelines distribution network software(Epanet 2.09) used for analyze of water losses in water distribution pipelines (Case study on primary pipelines for Sampangan all around region). Integrated programs has used for engineering management of public waterpipelines for waterloss estimating ones . It is macroanalysing (major losses in pipelines principles) that spacial related. Pressure difference at node between simulation and field checking is pressure loss that flow loss as long as those pipelines.

(Keywords : GIS, network analysing, MapInfo and EPAnet integrated, pipelines distribution network, water loss, drinking water)

Evaluasi Sistem Penyediaan Air Bersih Kota Kartasura

Anggi Tursilowati¹, Endro Sutrisno², Wisnu Hadi²

ABSTRACT

The increase of clean water consumption have correlation with growth and resident growth of a region. To fulfill the requirement, there is a need for a water supply system which can work properly. Kartasura through PDAM earn to give maximal service. But at the moment there are some problem that occurred at water supply system of Kota Kartasura. This evaluation aim is to learn various problems that exists in water supply system of Kota Kartasura.

Evaluation formed on the basic to some factor conducted to system of drinking water service in Kota Kartasura indicate that circumstance existing in the year 2005 is under adequate according to national standart service of drinking water . The actual condition especially can be seen from leakage storage level which high enough that is 50,55 % so that cause the lack of water debit distributed to costumer.

The result of evaluation then can be applicable to reach goals that is the increasing of service percentage from 13,48 % becoming 56,74% from population amount in the year 2015 and the leakage emphasis till fulfill government standard. Water supply system evaluation of Kota Kartasura cover permanent water source, reservoir, transmission and distribution system used to reach the target.

Key words : Raw water source, transmission, distribution

ANALISA JARINGAN DISTRIBUSI SISTEM PENYEDIAAN AIR BERSIH KOTA BOYOLALI

KHUSNUL HUDA SAMBODJA (L2J 099 767)

Ir. Nasrullah, MS dan M. Arief B, ST, MEng, Sc

ABSTRACT

Water pressure in pipe represent important factor in drinking water supply system. To earn to conduct water optimally, required enough pressure. That is between 10 until 80 mka. Drinking water supply system of Boyolali City in the year 2005 is not optimally yet. Because still exist pressures values outside of planning standard. According to simulation result with Epanet Version 2.0, minimum pressures at peak hour condition (at 07:00) is -1,83 m and maximum pressures is 106,70 m. But, raw water productions in the year 2005 still answer the demand of residents consume requirement. Mean produce per day is about 7.241,40 m³/day and water consume is about 5.718,96 m³/day. Thus, in distribution pipes network of clean water is need to repair to reduce the happening of water leakage because of big pressures. Distribution service of clean water in PDAM of Boyolali City after repaired to become better because yielded pressures fulfilling criterion of water pressures planning in distribution pipes network. According to simulation result with Epanet Version 2.0, minimum pressures at peak hour condition (at 07:00) is 8,10 m and maximum pressures is 69,90 m

Key words : water supply, distribution pipe network, pressure, flow quantity and continuity.

**STUDI PENURUNAN KESADAHAN AIR TANAH DANGKAL DAERAH
PESISIR DENGAN METODE PENUKARAN ION MENGGUNAKAN
ZEOLIT SEBAGAI ALTERNATIF PENYEDIAAN AIR BERSIH
(STUDI KASUS AIR SUMUR DANGKAL DESA WRINGINJAJAR, MRANGGEN,
DEMAK)**

AGUS MAKFUR (L2J000741)
Nurandani Hardyanti, ST, MT dan Ir. Mochtar Hadiwidodo

ABSTRACT

High water hardness leads to high detergent use which caused a part of detergent molecule linked by Ca/Mg. The Experiment was analyze water hardness removal by using zeolite, testing zeolite-ion exchange affordability, determine velocity constant and zeolite capacity in removing the water hardness. Batch and Column experiment was used. Varies of influen, size and weight of medias was applied on batch experiment. The column experiment varied the influen and size of medias. Zeolite size in 30-60 mesh dan 16-30 mesh were the most effective in batch experiment. 30,65-82,83% ($C_{eff}=100-1100$ mg/L $CaCO_3$) efficiency was achieved in batch which is size 30-60 mesh 15 grams weight. 95-100% ($C_{eff}=0-1400$ mg/L $CaCO_3$) efficiency was achieved on column experiment. The adsorption data fitted well with Freundlich model. The values in 30-60 mesh $C_{in} = 600$ mg/L $CaCO_3$ were $k_1=0,0736$ ml/mg.dtk and $q_0=6,31327.10^{-5}$ mg/mg, otherwise in 1500 mg/L $CaCO_3$ were $k_1=0.02944$ ml/mg.dtk and $q_0=8,11906.10^{-5}$ mg/mg.

Keywords : water hardness, ion exchange, zeolite, batch process, column process

LAPORAN TUGAS AKHIR
EFISIENSI PENURUNAN KEKERUHAN, ZAT ORGANIK DAN
AMMONIA DENGAN TEKNOLOGI BIOFILTRASI DAN TEKNOLOGI
ULTRAFILTRASI
DALAM PENGOLAHAN AIR MINUM

(Studi Kasus : Pengolahan Air Baku Air Minum PDAM Pulo Gadung)

FIKROH AMALI FAHMI ADDIANI (L2J000761)
Nurandani Hardyanti, ST, MT dan Sudarno, ST, MSc

ABSTRACT

The raw drinking water in Jakarta have decreased in quality. According to the data about raw water in PDAM Pulo Gadung (August, 2004) ammonia concentration varied until 2,0 mg/l, that value have reached out the standard of ammonia (1,5mg/l) according to KepMenkes No 907/MENKES/SK/VII/2002.

Ammonia in raw water can react with chlor to be choramine which have lower disinfection power. It is can make chlor consumption being bigger, beside that presence of THMs and chlorophenol as by product of disinfection is bigger. This compounds may cause cancer (carcinogenic). Therefor ammonia must removal from drinking water.

One of the alternative to decerase ammonia from raw drinking water is by combination of biological process that is biofilter with plastic medium type of honeycome tube and ultrafiltration with hollow fiber membrane processes. Research doing by flowing the water into the reactor continuously on aerobic and nonaerobic condition with the varied hydrolic residence time from 5-2 hour then continued with ultrafiltration process.

Efficiency of ammonia decreased in nonaerobic condition in bioreactor average between from 41,45 - 70,30% and efficiency in ultrafiltration 34,48 - 38,71%. While in aerobic condition in bioreactor average between 44,04-75,00% ,in ultrafiltration 35,00 - 38,89%.

Key word : Ammonia, THMs, Biofilter, Bioreactor, Honey tube, Ultrafiltration, Hollow Fiber

**PERENCANAAN JARINGAN DISTRIBUSI PRIMER
INSTALASI PENGOLAHAN AIR (IPA) LOSARI
KABUPATEN BREBES**

HERMAN SUSILO (L2J 000 768)
(Ir. Irawan Wisnu Wardhana, MS.) dan (Wiharyanto Oktiawan, ST. MT.)

ABSTRACT

Brebes District is a medium city of the Province of Central Java. Brebes District has 166.177 Ha including 17 sub district, 292 village with populations in 2005 has 1.727.046 people. Brebes citizens has been serviced by PDAM reached 5,16%. Most of them which consumes clean water is people who lives in the city. Based on that reason, Water Treatment Plant will be established in Randusari village, Losari, Brebes with plan capacity has 300 l/s.

IPA LOSARI will serve amount of water required in five District Capital Cities, that is Losari, Tanjung, Bulakamba, Kersana, and Ketanggungan. For the purpose need to be planned primary distribution network which will distribute water from IPA Losari towards to five IKK.

Key words: primary distribution network, flow, pipe

***EVALUATION OF CLEAN WATER SUPPLY SYSTEM USING INDEX SYSTEM IN DR.
KARIADI'S HOSPITAL SEMARANG***

RATNA RAHMAYANTI (L2J000792)
Ir. Nasrullah, MS. dan Estri Irawati, SKM.

Dr. Kariadi's Hospital is old and has a large area. Complex activities and its large area made this hospital need an evaluation on its clean water supply system. An old system which been operated is decreasing in performance and emplacement. Evaluation consists of quality, demand, and facility in clean water supply. Mean index of clean water quality is 0.85 which means very good. Index of clean water emplacement is 0.59 which means enough. Index of pump checking is 0.75 which means good. Index of water demand is 0.87. The index calculation shows this system need repairmen in clean water facility such as clean water tower. Some pumps also need repairmen and deposit pumps supply.

Key word: Evaluation, Clean Water System in Dr. Kariadi's Hospital Semarang, Index

STUDI OPTIMASI PROSES PENGOLAHAN AIR BERSIH DI PUSDIKLAT MIGAS CEPU
DENGAN PILOT PLANT

MULYONO (L2J 202 007)

ABSTRACT

Clean water processing installation is a mean of processing raw water to become clean water which is in accordance with requirements determined by the government so that it is safe to be consumed. PUSDIKLAT MIGAS CEPU of institution which has clean water processing installation that processes Solo river water to become clean water to be distributed to the consumers in Cepu and its surroundings.

Based on the result of evaluation it can be said that the clean water processing in PUSDIKLAT MIGAS CEPU is not optimal yet, therefore there is a waste of chemicals used, as well as a low quality of clean water produced. In line with this condition the writer proposes an improvement by using the pilot plant

The optimization aims to repair for all units of installation of clean water processing in PUSDIKLAT MIGAS CEPU by methods using

1. Jar test to know optimum alum dose at optimum pH parameter
2. To apply optimum dose of alum at pilot plant to obtain optimum condition

The research of clean water processing operation has been done by evaluating all the existing equipment based on the result of the research it can be said that all the equipment has been in accordance with the design criteria for the raw water with the capacity of 0,5 liter/ second

Further the result of research to aimed clean water which is in accordance with requirements needed alum dose about 90 ppm, kaporit dose about 15 ppm and kapir dose 5ppm. Thereby will reduced cost for m³ clean water produced is

Rp 1796,25 - Rp 1469,38 = Rp 226,87

**PENGARUH WAKTU INJEKSI DAN KONSENTRASI OZON SERTA pH TERHADAP
KEBERADAAN BAKTERI *ESCHERICHIA COLI*
PADA PROSES DESINFEKSI AIR MINUM DENGAN OZONISASI**

RIA TRIANY (L2J001784)

Prof.Dr.Ir. Kris Tri Basuki, MSc dan Junaidi, ST

ABSTRACT

The prime requisite of drinking water is that has to be free of pathogen microorganism. Ozon can be used as disinfectant to kill Escherichia coli bacteria. It is an indicator of fecal contamination in water and can cause severe waterborne illnesses. Disinfection with chlorine in a long term may harmful the healthy because of the carcinogen. The object of this experiment is to find the optimum of injection time, ozon concentration, and pH to kill Escherichia coli bacteria. The power of ozonizer that used is 100 Watt. The experiment consists of three steps. Step I, the formation of the optimum injection time based on variation of ozon injection time. Step II, the formation of the optimum pH from the ozon injection time and pH variation. Datas from Step I and II are used for Step III, that purposed to compare among three of well samples. From the result of experiment, the ozon production rate is 0,02 mg/dt. From the experiment, it is obtained too that the increasing of ozonization time can be increasing ozon concentration that produced so the concentration of Escherichia coli bacteria is decreasing. At 50 seconds of injection time or at 10 mg/L of ozon concentration, all of E.coli are died when the beginning condition of E.coli are 2400 MPN/100 ml and pH 6,36. Besides of that, the increasing of injection time or the increasing of ozon concentration and the increasing of water pH, can cause the increasing of E.coli removal efficiency. When pH is increased to 8, the injection time is faster to kill all of E.coli, there is 20 seconds or at 4 mg/L of ozon concentration.

Key Words : Disinfection; Escherichia coli; Ozonization

**EVALUASI DAN PENGEMBANGAN
JARINGAN DISTRIBUSI AIR BERSIH KOTA PEKALONGAN**

BASKORO AJI (L2J 001 744)

**DESAIN PEMBENTUKAN ZONE 1 JARINGAN PIPA DISTRIBUSI
PDAM KOTA SEMARANG
DI WILAYAH PELAYANAN SEMARANG UTARA**

Gilang Gumilar Perdana*, Irawan Wisnu Wardana**, M Arief Budihardjo**

ABSTRAK

Semarang City's PDAM on the North Semarang uses an interconnection network system. This causes difficulty in optimizing the network distribution supply and controlling the water leak. Semarang City's PDAM is planning to divide the area in to 25 zones. This thesis purpose is to plan one of the zone areas, which is zone 1. The existing condition on zone 1 shows that the water source is from Siranda distribution reservoir. The water flow is caused by the gravitation. The distribution pressure on the pipe network is not even. We can still find pressure drop between 3 to 7 metre water column at the peak condition on the end of the furthest point in the network. The strategy in planning the network is by cutting the interconnection pipe, providing new pipes, closing the existing valves, adding new valves for isolated areas, adding primary water meter and sub zone water meter and moving the interconnection pipes. After planning the zones, we analyze the distribution system by using Epanet 2.0 program that can show the effort of the changes that is made. The system shows that there is no more pressure drop on the area. The pressures are between 11-16 metre water column. And the water flow in the pipes are more alike, between 0,3 to 3 m/s. The PDAM can observe the distribution and the water leak more easily by using this system.

Keyword : zone, pressure, distribution pipe network

DEVELOPMENT OF WATER SUPPLY SYSTEM IN WIJAYAKUSUMA INDUSTRIAL ESTATE SEMARANG

Endro Sutrisno ¹⁾, Nurandani Hardyanti ¹⁾, Ahyani ²⁾

Abstract

Wijayakusuma Industrial Estate Semarang as industrial estate have to earn to fulfill amount of water required that is needed by industries in the industrial estate, so that be needed by water supply system of up to standard and good cleanness to support the continuity of process in industry. Water supply system in Wijayakusuma industrial estate managed by area organizer that is PT Kawasan Industri Wijayakusuma (Persero) Semarang.

Water supply system in Wijayakusuma Industrial estate begin from water source. Water be transmised go to reservoir by using pipe of PVC with diameter 200 mm and 300 mm. Distribution network use pipe of PVC with diameter 50 mm, 75 mm, 100 mm, 150 mm and 200 mm. Water treatment installation which be planned is chlorination unit with requirement volume of solution chlorine basin is 0,411 m³. After that be distributed with piping system go to industries of clean water client.

At planning of depelovment of water supply system in Wijayakusuma Industrial Estate pursuant to site plan which have there, in general indicate that existing standard water amount still last for fulfilling requirement of area, but its quality to be improved by doing processing.

Keyword : Water supply system, industrial estate

**PERENCANAAN JARINGAN DISTRIBUSI
SISTEM PENYEDIAAN AIR BERSIH
KECAMATAN ANDONG, NOGOSARI, DAN NGEMPLAK
KABUPATEN BOYOLALI**

IKA NURI ARSYADANI (L2J 001 763)

M. Arief Budihardjo, ST, MEng.Sc dan Haryono Setyo Huboyo, ST, MT

ABSTRACT

Boyolali is one of district in Central Java which consists of 19 subdistricts. Approximately 47,37 % of its area has not been served by PDAM water supply system. Andong, Nogosari and Ngemplak Subdistrict are three of them. The three subdistricts have big potentition in housing, trading, and public service sector. Because of that, water supply and distribution system is very important and necessary. Based on water demand calculation, average water demand in 2013 is 72,82 litre/second and in 2018 is 92,80 litre/second. Average water demand for each subdistrict is Andong Subdistrict 24,8 litre/second, Nogosari Subdistrict 18,58 litre/second, and Ngemplak Subdistrict 49,42 litre/second. Plan capacity of raw water source is 98 litre/second, consists of 5 units deep wells placed at Kacangan Village with plan capacity 19 litre/second, 2 units at Ngesrep Village with each plan capacity is 22 litre/second and 19 litre/second, at Glonggong Village 20 litre/second, and at Dibal Village 18 litre/second. Based on result of distribution network analysis in year 2018 using EPANET, known that pressure and velocity are required to the water distribution piping network standards. The highest pressure at junction 63 is 60,14 m and the lowest pressure at junction 276 is 10,75 m. The highest velocity at pipe 60 is 3,05 m/s and the lowest velocity is 0,29 m/s at pipe 71. The cost to construct deep wells, reservoirs, transmission pipes and distribution pipes is Rp. 11.193.302.802,-, calculated from estimation cost for the first 5 years design. The estimation cost for the second 5 years development is Rp. 1.232.826.527,-.

Key words: water supply system, Boyolali, distribution network.

**DESAIN PEMBENTUKAN ZONA TENGAH 1 JARINGAN PIPA DISTRIBUSI
PDAM KOTA MAGELANG
DI WILAYAH PELAYANAN MAGELANG TENGAH**

Rossi Agung Pramudyo*, Endro Sutrisno**, Anik Sarminingsih**

ABSTRACT

The water loss on the distribution line causes many losses towards the society, the agency of clean water provider institution or PDAM (Perusahaan Daerah Air Minum/ Regional Company of Drinking Water), as well as the environment surroundings. The loss of water on the distribution line causes society or the consumer not gain the clean water in its maximum capacity, the PDAM institution is not gaining maximum income from the costumers' retribution because many of the distributed water is lost on the process of distribution. In the distribution network system, Magelang city PDAM has not yet purely applying the zoning method or having the interconnection network pattern, this causes the difficulty in optimizing the distribution network service and to control the water leakage. The aim of this thesis is to make one of the zone designs, which is the middle zone 1. The existing condition in the middle zone 1 is the most dense and complex area of its layout as well as its society social and economic situation. This area is provided by several water sources: Kalimas II source, Kalegen source, Wulung source and Tuk Pecah source and the channeling system which is been used is gravity system. The pressure distribution on the pipe network is not distributed evenly. The design which has been carried out on the zone forming is including the disconnection of interconnection pipe, closing of the existing valve, the valve installation to isolate the area, installation of main water meter and middle sub-zone water meter and relocation of interconnection pipe. After the zone forming design is executed, the analysis process on distribution network using the application program of Epanet 2.0 version shows the activity of providing clean water system which is more optimal and it success to be simulated without any problems, the pressure also has already in appropriate standard and the water flow speed in pipe more evenly (0.3-3 m/sec). Moreover, it is easier for PDAM to control and supervise the water loss.

Keyword : Water loss, zone, pressure, distribution pipe network

**EVALUASI DAN OPTIMALISASI
UNIT PENGOLAHAN AIR BERSIH (IPA)
PDAM KABUPATEN BATANG DAERAH PELAYANAN KOTA BATANG**

Wahyu Dwi Nugroho*, H. Ir. Mochtar Hadiwidodo, Wiharyanto Oktiawan, ST, MT****

ABSTRACT

Request of service of clean water progressively increase and because of unstable of spring which supply standard water for the requirement of Batang City during the time, cause PDAM in Batang join with private sector evaluate and optimalize water treatment existing unit. Result from doing this activity is continuity and well guaranteed in supplying clean water for the requirement of Batang City in next ten years. This final project's objective is giving any solution in supplying clean water for the requirement of Batang City on dry season and next year's requirement by using standart water from Tumbreb Spring and six Deep Wells. Water treatment installation is designed according to the existing condition, quality standart of drinking water to be inforce currently, and design criterion from any literature. Analysis result shows that drinking water requirement for the planning area (Q) is 70 L/s with iron element (Fe) as a parameter quallity that must be processed. After testing this standart water three times, it is decided to design a water treatment installation which consist of two filtration unit for the Tumbreb Spring and six Deep Wells, and also another supporter buildings

Key word : Clean Water Requirement, Water Treatment Installation

**PERENCANAAN SISTEM TRANSMISI AIR BERSIH
DARI KECAMATAN NALUMSARI SAMPAI KECAMATAN JEPARA, KABUPATEN
JEPARA**

Hersiwi Widiasih¹, Winardi Dwi Nugraha², Ika Bagus P³

**PENYUSUNAN RENCANA INDUK (MASTER PLAN)
PENYEDIAAN AIR MINUM PERDESAAN
KABUPATEN CILACAP JAWA TENGAH**

MOCHAMMAD BAYU PRAHARA (L2J004668)

Abstract

Cilacap District is one of regencies in Central Java Province. Based on data from only 19.33% Water Cilacap community gets clean water services. Whereas the MDG targets related to drinking water supply is a reduction of half the number of people without access to drinking water sources. Cilacap District has many springs that can be used to meet the water needs of rural communities. But the problem is how to channel technical and clean water to the society efficiently. Infrastructure can overcome these problems. Therefore the Water System Master Plan required. SPAM Master Plan formulation prepared in accordance with the technical factors, economic, and public participation. The level of water service at the end of the year 2029 Master Plan for 80%. The total number of rural community water needs for 297, 4 lt / sec and 68,637house connection in the year 2029

key word: Clean Water, Rural area, Master Plan, Spring

Perencanaan Sistem Penyediaan Air Bersih Berbasis Masyarakat
(Studi Kasus Desa Borobudur Kecamatan Borobudur Kabupaten Magelang)

Abdur Rochman¹, Endro Sutrisno², Anik Sarminingsih²

**RENCANA INDUK (MASTER PLAN) SISTEM PENYEDIAAN AIR BERSIH WILAYAH PEDESAAN
KABUPATEN TEMANGGUNG**

Bagus Tri Buko Nugroho¹⁾, Endro Sutrisno²⁾, Haryono Setyo Huboyo³⁾

ABSTRACT

Temanggung District is one of district which located in Central Java. This kabupaten consist of 703.346 people and has 87.506 Ha land area which divided into 20 kecamatan. Based on RTRW, there are two area in Temanggung District, city area and rural area. Clean water is very important to people, but in fact any people in Temanggung District difficult to get clean water. There are a lot of spring in Temanggung, but they were not used yet because there no infrastructure to flow water from spring to people. In order to flow water, it need pipe system, which called water supply system. Water demand in city area is supplied by PDAM Tirta Agung, but many village was not get water supply yet. In rural area only 42% of people get water supply access. Based on Millenium Development Goals, in 2015, rural area must reach 60% water supply with pipe system. To reach this target, Temanggung District need master plan water supply. In 2015, 60% people in rural area must get water supply access and it will grow up to 80 % in 2020. Water demand Development of water supply system based on rank which composed from many aspect, such us healthy and sanitary, poverty, water supply service. Master plan is composed for 20 year, from 2010 until 2029. In 2029, total water demand is 544,78 l/s and it can be supplied by spring in Temanggung District.

Keywords: *rural area, water supply, MDGs, springs ,masterplan*

EVALUASI DAN PENGEMBANGAN JARINGAN DISTRIBUSI AIR BERSIH KECAMATAN KEDUNG, KABUPATEN JEPARA

GAMMA NANDA B. (L2J 004 653)

M.Arief Budihardjo dan Endro Sutrisno

ABSTRACT

Kedung sub-region is part of area Jepara Region. The sub-region has important enrollment for Jepara Region. Kedung Sub-region next to Demak Region, so it has much economical potency due to local social welfare. Population growing annually 1, 06 %, and the population growth causing high water supply demand. Nowadays, PDAM Jepara as water supply body has already covered 23% of recent water demand. And in the fact, many villages on kedung sub-region have high demand for water supply. From identification study was had done by PDAM could find one water resource there is deep well resource. From the identification study and increasing water demand need to planning design for fulfilling people necessity to get water for life. Water supply system in kedung sub-region divide into 2 system, first is called Kedung I and secondly is called Kedung II. In the design, will expand coverage area of water pipelines network from 75,36% to 90% for Kedung I system. Kedung II system recently has 13,51% and will expand coverage to 24%.

In this evaluation and development water distribution network, make some decision to meet between water demand and water resource capability in Kedung sub-region. Water distribution of Kedung sub-region consist two systems i.e. Kedung I system and Kedung II system. Water storage facility is using reservoir with grounded tank model. And water flowing by pressure pumping.

DESAIN PERENCANAAN TEKNIS SISTEM DISTRIBUSI AIR BERSIH (Studi Kasus: Kecamatan Bangsri, Kabupaten Jepara)

Lusiana Kholifah¹, Arief Budihardjo², Badrus Zaman²

ABSTRACT

Bangsri is a sub-region of Jepara region, which located at North West of the region. Bangsri is central of public services for surrounding area. Public services facilities both economic and social growth rapidly and change characteristic of the area into rural-urban fringe. Besides of spatial growth, population in this area grows 2, 31% annually. In this moment, Jepara PDAM has served 8% people of total Bangsri sub-region population. Clean water necessity in the area is high. Nowadays, only one village from 12 villages has covered by pipelines system of PDAM. Water resources identification study in this area could find alternative from deep well resources. Two deep well resources are PAT (groundwater drilling), each well have flow 15 liter/second. PAT well is potential resources for clean water. So that, need detail study to plan water distribution system to serve people necessity of clean water and also maximizing of PAT resources with pipelines network. Based on the survey in the area, peoples interest for clean water distribution system as high 65%. In this Detail Engineering Design makes some decisions for effectiveness water resources and priority of cover area with high necessity in 2018. Detail engineering design of expanding clean water network in Bangsri will be held in two separated network system. Design I (Krasak System) have Length pipe 13, 6 km and design II (Kedung Leper System) Length pipe is 9, 5 km. Distribution storage tank using grounded reservoir model for both system. Total investment for establish clean water network system in Bangsri Sub region is IDR Rp. 2.139.461.906,00

Keyword: Detail Engineering Design, Clean Water Distribution System, Ground water drilling

DESAIN DETAIL SISTEM DISTRIBUSI AIR BERSIH KECAMATAN WELAHAN, KABUPATEN JEPARA

**Martanti D.S
M. Arief B , Winardi D.N**

ABSTRACT

Welahan is one of sub-region of Jepara region, which has important function for the region. Welahan sub-region located at outside border of Jepara region on the southern next to Demak Region. One of some potentiality of this sub-region is economical potency for increasing social welfare for locals. Welahan population is growth rapidly 1,55 % annually. Clean water supply is being needed for domestic and non-domestic necessity. Nowadays only 3,46 % Welahan population have been coverage by PDAM water supply network. In fact, some village in Welahan sub-region really need clean water supply network. Water resources identification study from PDAM Jepara finds 2 alternative water resources. Both of them are deep well water resources. So that, design of water supply system is needed to meet between people demand and water resources. Detail Engineering Design of water supply system for welahan sub-region arrange based on water resources capability. In this engineering design at least 5 villages with highest necessity will be covered by the new design. The Detail Engineering Design arranges in 3 separated systems, 2 systems totally separated with existing and one will be extended from existing system. Each of them have distribution length pipe 2,014 km, 26,146 km and 3,22 km. Distribution storage tank use elevated model and combine with pomp pressure for sufficient pressure in water flow rate

Keyword: detail design, water supply system, deep well